
WEEDING OUT VECTORS OF NON-NATIVE SPECIES:

BIOSECURITY IN THE ANTARCTIC

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LIST OF ACRONYMS AND ABBREVIATIONS

AAD	Australian Antarctic Division of DEWHA
AAT	Australian Antarctic Territory
ANZ	Antarctica New Zealand
AQIS	Australian Quarantine Inspection Service
AFMA	Australian Fisheries Management Authority
ASMA	Antarctic Specially Managed Area
ASOC	Antarctic and Southern Ocean Coalition
ASPA	Antarctic Specially Protected Area
ATCM	Antarctic Treaty Consultative Meeting
ATCP	Antarctic Treaty Consultative Party
ATME	Antarctic Treaty Meeting of Experts
ATS	Antarctic Treaty System
AUSBIOSEC	Australian biosecurity system for primary production and environment
BAS	British Antarctic Survey
CAML	Census of Antarctic Marine Life
CDS	Catch Documentation Scheme (CCAMLR)
CEE	Comprehensive Environmental Evaluation
CEE	Comprehensive Environmental Evaluation
CEP	Committee for Environmental Protection
CLCS	Commission on the Limits on the Continental Shelf
CM	Conservation Measure (CCAMLR)
COMNAP	Council of Managers of National Antarctic Programmes
COP	Council of Parties
DAFF	Department of Agriculture, Forestry and Fisheries (Australia)
DEWHA	Department of the Environment, Water, Heritage and the Arts (Australia)
DOC	Department of Conservation (New Zealand)
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
HCA	Hydrographic Committee on Antarctica
HIMI	Heard and McDonald Islands
FAO	Food and Agriculture Organisation of the UN
HSM	Historic Site and Monument
IAATO	International Association of Antarctica Tour Operators
ICAO	International Civil Aviation Organization
ICG	Intercessional Contact Group
ICSU	International Council for Science
IEE	Initial Environmental Evaluation
IHO	International Hydrographic Organization

ILC	International Law Commission
IMO	International Maritime Organization
IOC	Intergovernmental Oceanographic Commission
IP	Information Paper
IPY	International Polar Year
IUCN	International Union for Conservation of Nature and Natural Resources – The World Conservation Union
IUU	Illegal, Unreported and Unregulated Fishing
IWC	International Whaling Commission
MAFBNZ	Ministry of Agriculture and Forestry Biosecurity New Zealand
MEP	Marine Environment Protection Committee
MFish	Ministry of Fisheries (New Zealand)
MPA	Marine Protected Area
NAP	National Antarctic Program
NGO	Non Governmental Organisation
NNS	Non Native Species
NZ	New Zealand
NZSAI	New Zealand Sub-Antarctic Islands
PA	Preliminary Assessment
PSSA	Particularly Sensitive Sea Area
RFMO	Regional Fisheries Management Organisation
SATCM	Special Antarctic Treaty Consultative Meeting
SCALOP	Standing Committee for Antarctic Logistics and Operations
SCAR	Scientific Committee on Antarctic Research
SC-CAMLR	Scientific Committee of CCAMLR
SEA	Strategic Environmental Assessment
SP	Secretariat Paper
SPA	Specially Protected Area
SSC-ISSG	IUCN Species Survival Commission – Invasive Species Specialist Group
UN	United Nations
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
VMS	Vessel Monitoring Scheme (CCAMLR)
WCPA	World Commission on Protected Areas
WG	Working Group
WMO	World Meteorological Organization
WP	Working Paper
WTO	World Trade Organization
VME	Vulnerable Marine Ecosystem

List of Abbreviated Legal Instruments

<i>Agreement on the Conservation of Albatrosses and Petrels</i> , opened for signature 19 May 2004. 2258 <i>United Nations Treaty Series</i> 257 (entered into force 1 February 2004).	ACAP
<i>The Antarctic Treaty</i> , opened for signature 1 December 1959. 402 <i>United Nations Treaty Series</i> 71 (entered into force 23 June 1961).	AT
<i>Convention on Biological Diversity</i> , opened for signature 5 June 1992. 1760 <i>United Nations Treaty Series</i> 79 (entered into force 29 December 1993)	CBD
<i>Convention on the Conservation of Antarctic Marine Living Resources</i> , opened for signature on 20 May 1980, 19 <i>International Legal Materials</i> (1980) (entered into force 7 April 1982)	CCAMLR
<i>Convention on the Conservation of Antarctic Seals</i> , opened for signature on 1 June 1972, 29 UST 441 (entered into force March 11 1978)	CCAS
<i>Convention on the conservation of migratory species of wild animals</i> , opened for signature 23 June 1979 1615 <i>United Nations Treaty Series</i> 356 (entered into force 1 November 1983)	CMS
<i>Convention on the Regulation of Antarctic Mineral Resource Activity</i> (opened for signature on 25 November 1988, 27 <i>International Legal Materials</i> (1988) (not in force) ('CRAMRA')	CRAMRA
<i>Environmental Protection and Biodiversity Conservation Act</i> (1999) (Australia)	EPBC Act
<i>The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks</i> 1995, opened for signature 4 August 1995, 34 <i>International Legal Materials</i> 1542 (entered into force 11 December 2001)	FSA
UNEP, <i>Global Programme of Action for the Protection of the Marine Environment from Land-based Activities</i> , UNEP(OCA)/LBA/IG.2/7, (1995)	GPA
<i>International Plant Protection Convention</i> , 17 November 1997. 2367 <i>United Nations Treaty Series</i> (entered into force 2 October 2005)	IPPC
<i>International Convention for the Prevention of Pollution from Ships</i> , opened for signature 2 November 1973 as modified by the 1978 Protocol opened, for signature 26 November 1983 and as regularly amended. 1340 <i>United Nations Treaty Series</i> 61 (entered into force 2 October 1983)	MARPOL 73/78
<i>Protocol on Environmental Protection to the Antarctic Treaty</i> , opened for signature 4 October 1991. 30 <i>International Legal Materials</i> 1455 (entered into force 14 January 1998)	PEPAT
<i>Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing</i> , opened for signature 22 November 2009. FAO Tre-154601 (not in force).	PSM Agreement
<i>Convention on Wetlands of International Importance Especially as Waterfowl Habitat</i> , opened for signature 21 December 1975. 996 <i>United Nations Treaty Series</i> 245 (entered into force 21 December 1975)	Ramsar Convention
<i>International Convention for the Safety of Life at Sea</i> , opened for signature 1 November 1974 as amended. 1184 <i>United Nations Treaty Series</i> 278 (entered into force 25 May 1980)	SOLAS
WTO, <i>Agreement on the Application of Sanitary and Phytosanitary Measures</i> , adopted 15 December 1993 GATT Doc. MTN/FA II-AIA-4 (commenced 1 January 1995)	SPM Agreement
<i>United Nations Convention on the Law of the Sea</i> , opened for signature 10 December 1982. 1833 <i>United Nations Treaty Series</i> 3 (entered into force 16 November 1994).	UNCLOS
<i>Vienna Convention on the Law of Treaties</i> , opened for signature 23 May 1969. 1155 <i>United Nations Treaty Series</i> 331 (entered into force 27 January 1980)	VCLT
<i>Convention concerning the protection of the World Cultural and Natural Heritage</i> , opened for signature 16 November 1972, 1037 <i>United Nations Treaty Series</i> 151 (entered into force 17 December 1975)	World Heritage Convention

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“And so you will sledge nearly alone, but those with whom you sledge will not be shopkeepers: that is worth a good deal.”¹

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Finally, gratitude is owed to Captain John Luc Picard for his strangely relevant words, even if referring to a slightly different alien threat but with a similar threat of apocalyptic homogeneity:

“They invade our space, and we fall back. They assimilate countless worlds, and we fall back. Not again. Not this time. The line must be drawn here! This far, no farther!”

¹ Apsley Cherry-Garrard, *The Worst Journey in the World*,

PREFACE

“Bioinvasion is a deeply unsatisfying policy topic. It is messy, frustrating, depressing and unpredictable: it does not lend itself to a neat solution.”²

“Give a weed an inch, and it will take a yard.”

Although this research has been concluded after the 2010 Antarctic Treaty Consultative Meeting in Punta del Este Uruguay, the results of the meeting have been mostly excluded from the thesis with the exception of a statistics relevant to the Report by IAATO incorporated into the introductory chapter.

The citation style used in this thesis is primarily sourced from the Melbourne University Law Review Association, *Australian Guide to Legal Citation* (2nd ed, 2002). However, in some cases the style differs. In particular, abbreviations and acronyms are used to describe some treaties and subsidiary instruments under those treaties in a manner departing from the guidelines. A full list of these abbreviations is contained in the preliminaries, as well as the comprehensive bibliography at the end of the thesis.

² C Bright, *Life Out of Bounds* (1998), 2.

ABSTRACT

Globally, invasive non-native species introduced by human vectors are one of the main drivers of biodiversity loss and the damage to the functioning of global ecosystems is arguably irreversible. Antarctica is the only continent to remain relatively unaffected but the warming climate and changing patterns of human use are eroding the natural biogeographical and climactic barriers that have isolated Antarctic species and ecosystems in their natural evolution.

Biosecurity is the exclusion, eradication or effective management of risks posed by NNS to the environment and broad obligations exist at the global level to engage in biosecurity measures to protect biological diversity. Although the issue has been significant attention in the context of the Antarctic Treaty System, including a permit based regulatory system for the intentional introduction of non-native species, there is no clear strategic focus on mitigating against unintentional introductions. Moreover, as only half of the tourist and fisheries operators are flagged to States outside the ATS, significant risks remain outside the ambit of the regional management organisation. The thesis evaluates the extent regional and international legal regulations address non-native species issues in the Antarctic through a vector based approach that focuses on the three main pathways of potential introduction; National Antarctic programs, tourist operators and fishing vessels.

The research shows there are gaps and inconsistencies in all the levels of response and a lack of strategic planning mechanisms and compliance processes that limit the individual efforts of States to address the issue. The obligations found in the Antarctic Treaty System create specific obligations to take into account the indirect environmental effects of Antarctic activity and addressing non-native species has been prioritised within some of the relevant institutions but there remain systematic issues that cannot be resolved without fundamentally altering the environmental management of the area.

The thesis proposes the development of a strategic biosecurity response within the Antarctic Treaty System that integrates the lessons learned at the domestic and global level. Although developing a unitary framework should be a priority, States should work incrementally to develop mechanisms based on risk assessment and analysis with an end goal of binding measures under the Antarctic Treaty System. An institution that binds the disparate approaches of States operating in the area with a mandate to strategically integrate comprehensive preventative, surveillance and response measures into Antarctic and relevant international management processes is essential. More fundamentally the thesis argues that strategic area based planning, reporting and inspection processes are necessary to address the cumulative impacts of Antarctic actor's activities and ensure all actors within the Antarctic area comply with biosecurity objectives.

VECTORS OF NON-NATIVE SPECIES IN THE ANTARCTIC AREA

“From prehistory to the present time, the mindless horsemen of the environmental apocalypse have been overkill, habitat destruction, introduction of animals such as rats and goats, and diseases carried by these exotic animals...In recent centuries, and to an accelerating degree during our generation, habitat destruction is foremost among the lethal forces, followed by the invasion of exotic animals.”¹

“It can no longer be assumed that the remoteness and extreme climatic conditions of Antarctica will protect it from the unintentional introduction of non-native species.”²

1.1. INTRODUCTION

This thesis focuses on legal mechanisms that address the unintentional introduction of non-native species (‘NNS’) in the maritime and continental Antarctic areas and the Southern Ocean south of the Antarctic Convergence.³ The need for comprehensive and strategic legally-backed responses to NNS in the Antarctic was identified in a 2006 Workshop on NNS in the Antarctic. The Workshop identified the considerable risks that NNS pose to the Antarctic environment and the lack of any systematic response to the issue.⁴

The Antarctic continent is perhaps the only terrestrial space on the planet left relatively untainted by the anthropogenic spread of NNS and the resultant environmental impacts. However, the oceanic

¹ E O Wilson, *The Diversity of Life* (1992), 253.

² B Mansfield and N Gilbert, ‘Availability and Applicability of Legal Tools for Managing [NNS]’, in M Rogan-Finnemore (ed.), *Non-Native Species in the Antarctic Proceedings* (2008), 131.

³ Hereafter “the Antarctic”. The Antarctic includes three distinct biogeographical zones: the sub-Antarctic islands close to the oceanic Polar Frontal Zone or Antarctic Convergence (the actual boundary of the Antarctic Convergence where the cold, northward flowing Antarctic waters clash with the relatively warmer sub-Antarctic waters varies but is defined by the *Convention on the Conservation of Antarctic Marine Living Resources 1980* (below n 58), Article 1(4) as [50°S, 0°; 50°S, 30°E; 45°S, 30°E; 45°S, 80°E; 55°S, 80°E; 55°S, 150°E; 60°S, 150°E; 60°S, 50°W; 50°S, 50°W; 50°S, 0°]), the maritime Antarctic including the western coast to c. 72°S, the South Shetland, South Orkney, South Sandwich Islands, and Bøvetoya and Peter I Øya, and the continental Antarctic including the rest of the Antarctic Peninsula and the West Antarctic, all of East Antarctica and the Balleny Islands.

⁴ Mansfield and Gilbert, above n 2, 154.

and atmospheric barriers limiting the spread of NNS to the Antarctic have been steadily eroded with increasing human activity across the area and significant recent climate change in the maritime Antarctic.⁵ Invasive NNS are one of the main direct drivers of biodiversity loss across all biomes with collective costs to industry, biodiversity and management agencies conservatively estimated in the hundreds of billions of US dollars.⁶ An effective method of containing the spread of NNS is to impose functional biosecurity measures on the vectors of introduction.

Biosecurity is the exclusion, eradication or effective management of risks posed by NNS to the environment,⁷ and ranges from planning mechanisms to minimise NNS introduction, to monitoring and responding to an introduction to limit its impact on the environment. A biosecurity framework is usually instituted by the State that has sovereign power over an area or activity.⁸ However, States engaging in scientific activity in the Antarctic have put aside territorial interests and agreed to manage the area south of 60° latitude collectively through regular meetings and a system of related agreements under the *Antarctic Treaty 1959* ('AT').⁹ Despite parties to the Antarctic Treaty ('AT Parties') committing to comprehensive protection of the Antarctic environment and planning actions to avoid damage to Antarctic biodiversity and habitats under the Protocol on Environmental Protection to the Antarctic Treaty of 1991 ('PEPAT'),¹⁰ the only relevant biosecurity measures in PEPAT focus on issuing permits for the purpose of controlling intentional introductions.

AT Parties have not set out an adequate preventative framework to address the threat of the unintentional introduction of NNS despite the fact that the Committee of Environmental Protection ('CEP') established by Article 12 of PEPAT lists NNS management as the top priority of its five year work plan.¹¹ The fragmented and highly sectoral legal and institutional response is one of the most significant international problems with biosecurity. This is a particularly significant issue in the

⁵ P Convey, 'Non-native Species in Antarctic Terrestrial and Freshwater Environments: Presence, Sources, Impacts and Predictions,' in M Rogan-Finnemore (ed.), *Non-Native Species in the Antarctic Proceedings* (2008), 101-2.

⁶ T Tin *et al*, 'Impacts of local human activities on the Antarctic environment,' (2009) 21 *Antarctic Science* 1, 15.

⁷ Adapted from the definition found in the New Zealand Biosecurity Strategy: J Hellström, D Moore, N Young and S Goddard, *Tiaki Aotearoa Protect New Zealand: the Biosecurity Strategy for New Zealand* (August 2003), 5.

⁸ K Bastmeijer, *The Antarctic Environmental Protocol and Its Domestic Implementation* (2003), 1.

⁹ *The Antarctic Treaty*, opened for signature 1 December 1959. 402 *United Nations Treaty Series* 71 (entered into force 23 June 1961).

¹⁰ *Protocol on Environmental Protection to the Antarctic Treaty*, opened for signature 4 October 1991. 30 *International Legal Materials* 1455 (entered into force 14 January 1998).

¹¹ Australia, France and New Zealand, *A Work Program for CEP Action on NNS* ATCM XXXII WP 5 (2009).

Antarctic context, with biosecurity being addressed regionally, globally and in relation to specific Antarctic industries and domestic programs without any overarching strategy.

This thesis will support a strategic approach to biosecurity through an examination of the gaps in the international and regional legal framework addressing NNS in the Antarctic and a proposal for the development of a comprehensive regime to better address the risk of NNS introduction. It will do so by adopting a vector-based analysis that focuses on the three main pathways of NNS into the Antarctic environment: National Antarctic Programs ('NAP') primarily engaged in the support of scientific endeavour; tourist operators; and fishing vessels. The introductory chapter will evaluate the need for legal regulation in the Antarctic (focusing on the specific aspects of human interaction with the area which pose a particular biosecurity threat), define biosecurity terminology and explain the structure of the thesis.

1.2. THE ISSUE: NON-NATIVE SPECIES IN THE ANTARCTIC

Despite the low level of recorded NNS introductions in the Antarctic area compared with the sub-Antarctic islands,¹² a growing number of studies firmly reject the notion that the extreme environment of the Antarctic may be immune from the impacts of species from outside the Antarctic.¹³ Not enough is known about Antarctic biodiversity to draw decisive conclusions about the environmental impacts of NNS, particularly on marine and microbial indigenous populations, but predictive risk assessments, based on whether NNS have become invasive in other similar climatic and geographic conditions, indicate invasions are possible.¹⁴ Low species diversity and relatively simple community structure renders the Antarctic environment particularly vulnerable to highly adaptive NNS.¹⁵ Ecophysiological studies demonstrate that a range of non-indigenous terrestrial

¹² See Table 1.1 below.

¹³ The following reviews give a useful overview of the issue: M Rogan-Finnemore (ed.), *Non-Native Species in the Antarctic Proceedings* (2008); Y Frenot, *et al*, 'Biological invasions in the Antarctic: extent, impacts and implications,' (2005) 80 *Biological Reviews*; Tim, above n 6; M A Connor, 'Waste water treatment in Antarctica,' (2008) 44 *Polar Record*; K A Hughes, *et al*, 'Accidental transfer of non native soil organisms into Antarctica on construction vehicles' (2010) 12 *Biological Invasions* 877; P Convey *et al*, 'Biological Invasions' in D M Bergstrom, P Convey and H L Huiskes (eds.), *Trends in Antarctic Terrestrial and Limnetic Ecosystems* (2006) 192-218; D M Bergstrom and P M Selkirk, 'Human Impacts on Sub-Antarctic Terrestrial Environments,' (2007) 141 *Papers and Proceedings of the Royal Society of Tasmania* 1, 163-165.

¹⁴ S P Worner, 'Tools for Risk Assessment and Management of Non-native Species', M Rogan-Finnemore (ed.), *Non-Native Species in the Antarctic Proceedings* (2008); IUCN, *Antarctic non-native species; what can we learn from the global situation?* ATCM XXIX IP 57 (2006), 5.

¹⁵ Convey, above n 6, 101.

organisms can survive in the extreme conditions of polar environments.¹⁶ Natural dispersion is possible with air and water currents, natural debris and migratory birds and mammals carrying biota great distances,¹⁷ but studies in the sub-Antarctic indicate anthropogenic factors are by far the most prevalent cause of NNS introductions in higher latitudes.¹⁸ The established NNS identified in the Maritime Antarctic are found near human occupation and related to station activities.¹⁹ Moreover, human activity is responsible for spreading NNS between Antarctic locations. NNS that are pre-adapted to Antarctic conditions are likely to be genetically similar to indigenous species and may significantly impact biodiversity in the Antarctic.²⁰

TABLE 1.1: IDENTIFICATION OF ESTABLISHED NNS ACROSS ANTARCTIC BIOGEOGRAPHICAL ZONES²¹

Biological group	Entire sub-Antarctic	Continental Antarctic	Maritime Antarctic
Plants (terrestrial)	108	1	2
Invertebrates (terrestrial)	72	0	2-5
Vertebrates (terrestrial)	16	0	0
Plants (marine)	1	0	1

Although all human interaction with an area increases the risk of introduction, certain aspects of activity in the Antarctic pose a particular biosecurity threat. The thesis focuses on each of the three major human activities in the Antarctic by analysing the regulations that apply to the aspects of the activities that threaten NNS introduction. The only permanent presence in the Antarctic is maintained by NAPs. Involvement in the decision making processes of the Antarctic Treaty System

¹⁶ P Convey, 'The influence of environmental characteristics on the life history attributes of Antarctic terrestrial biota', (1996) 71 *Biological Reviews* 191.

¹⁷ Ibid, 102-104.

¹⁸ K J Gaston, *et al*, 'Rates of species introduction to a remote oceanic island' (2003) 270 *Proceedings of the Royal Society of London* 1091, 1095.

¹⁹ Hughes, above n 13, 879.

²⁰ Convey, above n 5, 111-114.

²¹ Adapted from Tin, above n 6, 15.

(‘ATS’) requires an AT Party to demonstrate its interest in Antarctica by conducting substantial scientific research activity there, such as establishing a scientific station or despatching a scientific expedition.”²² An estimated 4000 summer and 1000 winter personnel populate the 37 permanent and 16 summer-only active stations, with a large number of temporary field camps set up across continental Antarctica. Stations and field camps are usually established on ice-free areas and generally sites that favour human settlement also favour NNS.²³ Scientists regularly move around the Antarctic area for research purposes and ships and planes make a number of trips for the purposes of personnel change-over and re-supply of scientific stations.

Globally, transport vectors are one of the most significant pathways for the unintentional introduction of NNS and only a few legal tools exist for identifying and mitigating the risks posed by transport.²⁴ The increasing use of air routes allows rapid transfer of species into the Antarctic and between the different regions of the continent.²⁵ Marine NNS are introduced through the biofouling of vessels’ surfaces and marine debris and their presence in ballast water, sewage and other biosensitive wastes.²⁶ In the sub-Antarctic and Antarctic, established NNS have been attributed to hull fouling,²⁷ although there have been no identified instances of the establishment of NNS through ballast or marine debris.²⁸ In addition, NNS can be present in cargo, clothing, vehicles, scientific equipment, fresh food and building supplies, highlighting the importance of comprehensive decontamination procedures.²⁹ All cargo items used in Australian sub-Antarctic research have the

²² AT, Article IV(2).

²³ Y Frenot, *et al*, ‘Antarctic and SubAntarctic Biological Invasions: Sources, Extents, Impacts and Implications’ in M Rogan-Finnemore (ed.), *Non-Native Species in the Antarctic Proceedings* (2008), 74.

²⁴ C Shine, N Williams and G Gündling, *A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species* (IUCN Environmental Policy and Law Paper No. 20, 2000), 28.

²⁵ Frenot, above n 13, 60-61.

²⁶ J E Lee and S L Chown, ‘Mytilus on the move: transport of an invasive bivalve on the Antarctic’ (2007) 339 *Marine Ecology Progress Series* 309; P N Lewis, D M Bergstrom and J Whitnam, ‘Barging in: a temperate marine community travels to the Subantarctic,’ (2006) 8 *Biological Invasions*; P N Lewis, M J Riddle and S D A Smith, ‘Assisted passage or passive drift: a comparison of alternative transport mechanisms for non-indigenous coastal species into the Southern Ocean,’ (2005) 17 *Antarctic Science* 183.

²⁷ M N Clayton, C Wiencke and H Klöser, ‘New records and sub-Antarctic marine benthic macroalgae from Antarctic,’ (1997) 17 *Polar Biology* 141.

²⁸ North Atlantic spider crab species have been recorded from a trawl off the Antarctic Peninsula (M Tavares and G A S De Melo, ‘Discovery of the first known benthic invasive species in the Southern Ocean: the North Atlantic spider crab *Hyas araneus* found in the Antarctic Peninsula,’ (2004) 16 *Antarctic Science* 149); but there have been no subsequent records or evidence of establishment. See Tin, above n 6, 18.

²⁹ Hughes, above n 13 (vehicles); J E Lee and S L Chown, ‘Quantifying the propagule load associated with the construction of an Antarctic research station,’ (2009) 21 *Antarctic Science* 5; J Whinam, N Chilcott, and D M Bergstrom, ‘Subantarctic hitchhikers: expeditioners as vectors for the introduction of alien organisms,’ (2005) 121(2) *Biological Conservation* 207; A L Fortune, *Biosecurity at the Extreme: Pathways and Vectors between New Zealand and Scott Base, Antarctica* (Masters Thesis, University of Canterbury, 2006).

potential to act as NSS vectors.³⁰ Untreated waste generated by permanent operations and shipping also can introduce NNS into the environment.³¹ Despite the disposal of sewage demonstrably spreading human microorganisms into the Antarctic marine environment, sea-ice and intestines of invertebrate marine species³² almost 35% of stations still dispose untreated sewage into the sea.³³

Tourism operations pose different challenges for managing the risks of NNS introduction. Only a very small proportion of industry-affiliated operators participate in multi-day land-based expeditions in the continental interior,³⁴ lessening the impact of waste disposal and food vectors.³⁵ In addition, a considerable proportion do not make any landings, limiting possible impacts to marine transport vectors³⁶ and these voyages are likely to decrease when the International Maritime Organisation's ('IMO') Antarctic heavy fuel ban is implemented.³⁷ However, despite projected short term decreases in overall tourist numbers, longer term trends indicate a continued increase in shipborne tourism making landings along the Antarctic Peninsula.³⁸ Frenot *et al* identified four patterns of tourist activity that increase the potential for the industry to introduce NNS into the Antarctic area and between Antarctic locations.³⁹

Firstly, tourist visitation usually focuses on areas with high to medium biological diversity, the most sensitive areas for NNS introduction.⁴⁰ The concentration of visitation and traffic in these areas increases the possibility of introduction and necessitates area-based regulation. However, the

³⁰ Whinam, *ibid*, 209.

³¹ G A McFeters, J P Barry and J P Howington, 'Distribution of enteric bacteria in Antarctic seawater surrounding a sewage outlet' 27(4) *Water Research* 645.

³² J T Lisle, J J Smith, D D Edwards, and G A McFeters, 'Occurrence of microbial indicators and *Clostridium perfringens* in wastewater, water column samples, sediments, drinking water, and Weddell Seal feces collected at McMurdo Station Antarctica' (2004) 70 *Applied and Environmental Microbiology* 7269.

³³ Tin, above n 6, 19.

³⁴ Very little data is available about non-members of the International Association of Antarctic Tour Operators ('IAATO'), although the IAATO does not believe any non-member ships have planned operations in the Antarctic in 2011 to 2013. This does not include yachts with fewer than 12 passengers. IAATO, *IAATO Overview of Antarctic Tourism: 2009-10 Season and Preliminary Estimates for 2010-11 and Beyond* ATCM XXXIII IP 113 (2010), 24.

³⁵ Hull and Bergstrom, 215; 233 of the 36881 tourists that visited the Antarctic in the 2009-2010 season visited the continent. *Ibid*, 3.

³⁶ Nine vessels in the 2009/2010 season carrying almost 15,026 passengers, *ibid*, 3.

³⁷ IAATO, *ibid*, 9.

³⁸ H J Lynch, *et al*, 'Spatial patterns of tour ship traffic in the Antarctic Peninsula region' (2009) 22(3) *Antarctic Science* 123, 127-129.

³⁹ Frenot, above n 13, 58-59.

⁴⁰ Lynch, above n 38, 128.

popular areas change from year to year complicating area protection.⁴¹ This is related to the tendency for tour operators to explore for new sites which increases the potential for the dispersion of NNS. Hitchhiker organisms moving between islands with similar climates are more likely to establish successfully and typical visitor itineraries include successive visits to a number of sites within the sub-Antarctic and Antarctic, progressively moving to more extreme environments.⁴² In addition, the range of tourist activities has continued to increase from the 1980s-early 1990s model of observing immediate wildlife to undertaking extensive walks, marathons, short overnight stays, climbing, kayaking, SCUBA diving and hovercraft operations.⁴³ All these activities increase exposure time to the environment and require additional equipment than the traditional Antarctic expedition, increasing the potential for NNS contamination and introduction into new environments.⁴⁴ Tourists themselves are likely to have travelled to other high latitude or high altitude locations, with viable NNS, within six months before departing to Antarctic.⁴⁵

Uncertainty surrounds the potential for fisheries activities to introduce NNS. The biosecurity risk is related to the discharge practices of the ship, the nature and extent of fouling and the movement of the vessel in relation to the underlying marine ecosystems.⁴⁶ In the Antarctic, comparatively little is known about marine habitats and biota or the potential impact of fishing vessels.⁴⁷ However, a significant amount is known about the nature and volume of fisheries activity. 37 ships currently have been licensed to fish in twelve of the Food and Agricultural Organisation ('FAO') of the United Nations ('UN') Statistical Areas in the Southern Ocean for the 2009-2010 summer season.⁴⁸ In the sub-Antarctic, fisheries are managed by sovereign authorities and fish have been intentionally introduced into inland water systems in the sub-Antarctic Kerguelen Islands for food.⁴⁹ A review panel on fisheries management efforts in the Southern Ocean identified that certain fisheries activities pose a "significant risk" of introducing NNS through hull fouling, ballast water discharge and the use

⁴¹ Frenot, above n 13, 59; see *Appendix 6*.

⁴² *Ibid.*

⁴³ IAATO, above n 34, 3-4.

⁴⁴ *Ibid.*

⁴⁵ Whinam, above n 29, 217.

⁴⁶ T J Dodgshun, M D Taylor and B M Forrest, 'Human-mediated pathways of spread for non-indigenous marine species in New Zealand' (2007) *DOC Research and Development Series* 266, 21.

⁴⁷ Frenot, above n 13, 56.

⁴⁸ CCAMLR, *Vessels Licensed to Harvest in the Convention Area in the 2009/10 Intercessional Period, Reported to CCAMLR in accordance with Conservation Measure 10-02* (2009).

⁴⁹ D M Bergstrom and P M Selkirk, 'Human Impacts on Sub-Antarctic Terrestrial Environments,' (2007) 141 *Papers and Proceedings of the Royal Society of Tasmania* 1, 164.

of substantial quantities of imported bait associated with longline fisheries.⁵⁰ Outside the Antarctic, a causal relationship has been found between the spread of pathogens and non-native bait.⁵¹ Nevertheless, the uncertainty of fisheries operations poses significant issues in deciding the management steps to address NNS in scientific activity.

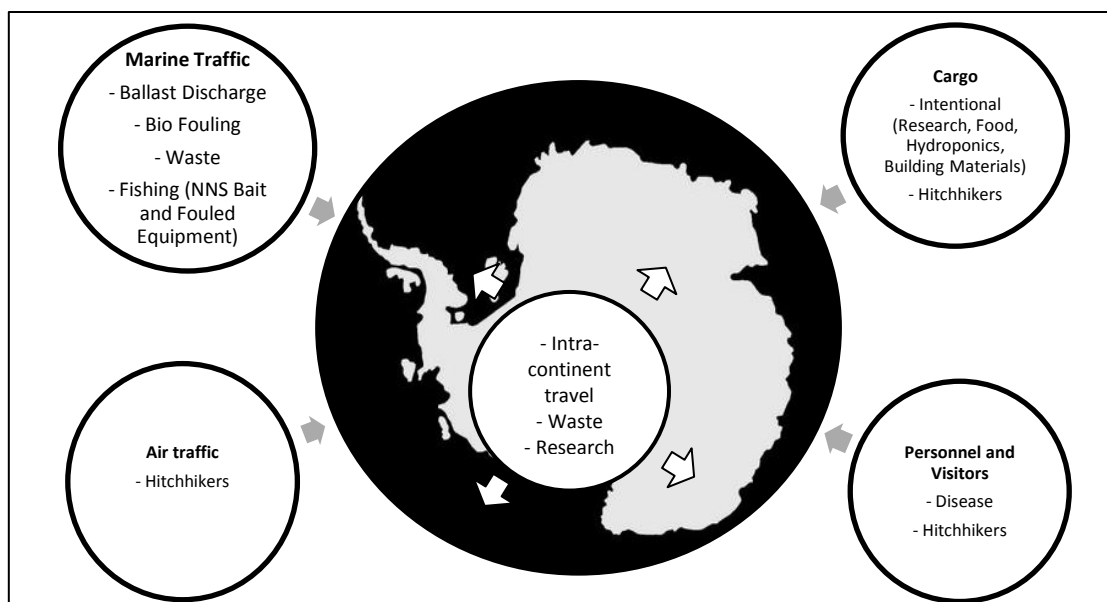


FIGURE 1.1: SUMMARY OF THE PATHWAYS OF NNS INTRODUCTION INTO THE ANTARCTIC AREA

1.3. DEFINITIONS AND APPROACHES

A variety of terms are used to describe NNS and the stages of introduction, causing considerable confusion in the literature and inconsistency across legal frameworks.⁵² Clear definitions are particularly important in an international legal context where terms must be operationalised and interpreted in a variety of domestic contexts.⁵³ For the purposes of this thesis, the approach of Frenot *et al* in the benchmark review of the presence and status of NNS in the Antarctic is adopted,

⁵⁰ CCAMLR Review Panel, *CCAMLR Performance Review Report* (2008) <<http://www.ccamlr.org/pu/E/e-Prfrm%20Review%20Report%20Jun09.pdf>> at 19 September 2009 [11].

⁵¹ A M Picco, 'Amphibian commerce and the spread of infectious disease in wildlife', (D Phil Thesis, Arizona State University, August 2008).

⁵² Shine, above n 24.

⁵³ Shine, *ibid*, 44.

but further elaborated for the purpose of facilitating a precautionary legal approach.⁵⁴ It is important for the definition of NNS to encompass all taxa and also reflect the variety within Antarctic taxa, including introductions from one part of Antarctica to another. This thesis adopts the appropriately precautionary 1992 Convention on Biological Diversity ('CBD')⁵⁵ definition of an NNS⁵⁶ as "a species, subspecies or lower taxon, introduced outside its natural past or present distribution, including any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce."⁵⁷ Introduction broadly involves the intentional or unintentional movement of NNS across any geographic barriers. NNS are distinguished based on the extent of their pervasiveness of their spread and the extent the organism overcomes natural and artificial filters.⁵⁸ A controlled NNS exists under the strict control of humans. Transient NNS⁵⁹ escape that control, survive in small populations but are either removed or die out through natural processes.⁶⁰ Persistent NNS⁶¹ survive, establish and reproduce for many years outside of human control but do not expand in range or significantly impact indigenous species. Invasive NNS spread into and displace indigenous communities.

TABLE 1.2: FRAMEWORK FOR DEFINING OPERATIONALLY IMPORTANT TERMS FOR BIOSECURITY IN THE ANTARCTIC

Filter Breached	Consequence	Terminology	Example
Geographic	Introduction into the Antarctic	Controlled NNS	Food/hydroponics ⁶² /pot plants ⁶³ /fouled ballast water

⁵⁴ Frenot, above n 23, 59.

⁵⁵ *Convention on Biological Diversity*, opened for signature 5 June 1992, 1760 *United Nations Treaty Series* 79 (entered into force 29 December 1993).

⁵⁶ Other papers use: 'alien', 'non-indigenous', 'adventives', 'immigrant', 'imported', 'exotic', 'foreign', 'new' and 'pest' which are interchangeable with NNS for the purpose of this thesis. R I Colautti and H J MacIsaac 'A neutral terminology to define 'invasive' species' (2004) 10 *Diversity and Distributions* 135, 136; D M Richardson, et al, 'Naturalisation and Invasion of Alien Plants: Concepts and Definitions,' (2000) 6 *Diversity and Distributions* 93, 99.

⁵⁷ CBD COP, Guiding Principles for the Implementation of Article 8(h) Decision VI/23 (2002), n57.

⁵⁸ See Table 1.2 above, adapted from Colautti and MacIsaac, above n 56, 136.

⁵⁹ Other papers use: 'temporary', 'casual' or 'waifs', *ibid*.

⁶⁰ If intentionally introduced, the NNS is defined in terms of its utility, for example; lab sample, hydroponics or working dogs. If unintentionally introduced, the NNS is referred to as a hitchhiker or stowaway. Shine, above n 24, 5-8.

⁶¹ Other papers use: 'naturalized', 'escaped'; Colautti and MacIsaac, above n 56, 136.

⁶² For example: permitted at Admundsen-Scott South Pole Station; Sweden, France and New Zealand, Inspection Report of Report of the Antarctic Treaty inspections undertaken jointly by Sweden, France and New Zealand in accordance with Article VII of the Antarctic Treaty and Article 14 of the Protocol on Environmental Protection to the Antarctic Treaty ATCM XXX Attached to WP 16 (2007), Appendix 1, 23.

Artificial	Introduction beyond human control, die out naturally or removed	Transient NNS	Microorganisms in discharged waste water ⁶⁴ /fly infestation in station ⁶⁵
Environment (local)	Reproduction over years in natural environment but no dispersal	Persistent or established NNS	<i>Poa annua</i> near Polish Arctowski Station ⁶⁶
Community suitability and local dispersal	Broad dispersal and displacement of indigenous populations	Invasive NNS	Rabbits on Macquarie Island ⁶⁷

This thesis will evaluate the domestic, regional and international approaches to biosecurity in the Antarctic in relation to the framework recommended by the International Union for the Conservation of Nature ('IUCN').⁶⁸ International best practice, gathered by the IUCN, indicates three approaches are essential to any effective legal response to NNS.⁶⁹ Firstly, the framework must be based on ecosystem-based management. An ecosystem is defined by the CBD as a "dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit"⁷⁰ and biosecurity is essentially a tool to preserve ecosystem integrity. The ecosystem approach to biosecurity involves international cooperation to strategically manage the risks NNS pose to land, water and living resources within a functional ecological unit and integrating management within a larger biogeographic framework.⁷¹ Furthermore, the prohibitive cost of responding to NNS invasions in the sub-Antarctic highlights the importance of planning and implementing strategies to prevent unintentional introductions. Prevention should involve limiting activity in sensitive and pristine areas, imposing decontamination measures on incoming vectors as well as establishing appropriate monitoring and contingency plans to ensure NNS do not become established. Finally, as there is a level of uncertainty in the consequences of any introduction, a level

⁶³ For example: found at Bellinghausen Station; United States, *United States Report of Inspections*, ATCM XXX Attached to IP 10 (2007), 40.

⁶⁴ M A Connor, 'Waste water treatment in Antarctica,' (2008) 44 *Polar Record* 165.

⁶⁵ New Zealand, *NNS Incursions at Scott Base, Antarctic* ATCM XXXI IP 75 (2008).

⁶⁶ M Olech, 'Human impact on terrestrial ecosystems in West Antarctica,' (1996) 9 *NIPR Symposium on Polar Biology, Proceedings* 305.

⁶⁷ K Springer, *Macquarie Island – mammalian pests, past, present and future* (2006) 23 *Aliens* 14.

⁶⁸ Shine, above n 24.

⁶⁹ Ibid, 31-34.

⁷⁰ CBD, Article 2.

⁷¹ Shine, above n 24, 31-32; CBD, above n 57.

of precaution should be incorporated into all decision-making involving the risk of NNS introduction.⁷² One of the issues in the framework of the ATS is uncertainty as to the level of acceptable risk permitted in the Antarctic context. Some pristine areas in the sub-Antarctic exclude all activity apart from monitoring and management and science relevant to management.⁷³ PEPAT reserves the Antarctic area as a “natural reserve for peace and science”, allowing for the freedom of science and peaceful activity within the context of comprehensive environmental protection. The balance between peaceful use and environmental protection is particularly critical in the realm of biosecurity, where any human presence threatens introduction. This thesis will explore to what extent a precautionary approach to biosecurity, in the context of preventative, ecosystem-based management, may be implemented in the Antarctic area, given the tools available under current global and regional legal instruments.

1.4. STRUCTURE OF THE THESIS

Each of the sources of biosecurity regulation for the Antarctic are explored in the thesis. The Chapters evaluate the extent that regional, global and Australian and New Zealand regimes provide for preventative biosecurity measures for each of the vectors of NNS and a compliance regime to support those measures. Throughout the five chapters, the thesis explores the capacity for AT Parties to adopt a precautionary biosecurity framework in the Antarctic, in the context of the balance between environmental protection and peaceful use at the heart of the ATS.

Chapter Two evaluates the regional approach to NNS through the ATS and other related instruments. The potential for AT Parties to adopt a biosecurity framework is explored in the context of the legal status of the continent and the tools mandated to protect the Antarctic environment under PEPAT. The responses to the specific threats posed by tourism and fisheries are also explored, particularly the regulation of the spatial extent of both by the ATS and self-regulation of Antarctic tourism by the International Association of Antarctic Tourist Operators (‘IAATO’).

Chapter Three discusses the applicability of global instruments in the Antarctic area with a focus on international biodiversity law and the law of the sea and the extent both complement the regional approach to the issue. The marine areas of the Antarctic are high seas under the United Nations

⁷² D Vanderzwaag ‘The Precautionary Principle and Marine Environmental Protection: Slippery Shores, Rough Seas and Rising Normative Tides’ (2002) 33(2) *Ocean Development and International Law* 165, 167.

⁷³ See for example: Minimum Impact Islands in the New Zealand Sub-Antarctic Islands; M Jay, M Morad and A Bell, ‘Biosecurity: A policy dilemma for New Zealand’ (2003) 20 *Land Use Policy* 121, 125.

Convention on the Law of the Sea 1982 ('UNCLOS')⁷⁴ and thus all States have a qualified freedom to navigate the area under the customary freedoms codified in the treaty.⁷⁵ Linking with the global protection of biodiversity, Chapter Three examines the biosecurity provisions in the international regime of the high seas and their appropriateness in an Antarctic context.

Chapter Four assesses the legal rules discussed in the previous chapters in the context of domestic implementation with a discussion of Australia and New Zealand's biosecurity policies towards the Antarctic. Both have implemented express domestic policy attempting to minimize or eliminate the introduction of NNS into the Antarctic area through their scientific operations. In addition, both have developed frameworks to address biosecurity threats in the sub-Antarctic. Contrasting and comparing the approach of the two States protecting pristine areas under their sovereign jurisdiction in the sub-Antarctic and their activities in the Antarctic will permit an exploration of the suitability of an international approach to biosecurity in the Antarctic.

The last chapter of the thesis consolidates the gaps and priorities isolated in the previous three chapters and identifies the components and methods needed to institute a comprehensive biosecurity framework in the Antarctic. The foundations are already being set by a Intercessional Contact Group ('ICG') of the CEP that has established a programme of work on the issue of NNS.⁷⁶ Key to the effectiveness of the regime will be ensuring that main objectives and guiding principles adequately provide for a precautionary approach to biosecurity. A permanent advisory body should form the basis for a clearing house of biosecurity best practice, driven by States like Australia and New Zealand that have already implemented effective biosecurity policy for their Antarctic activities. The integration of biosecurity into current tools gives AT Parties the opportunity to strengthen their monitoring, inspection and reporting measures to ensure they provide for compliance. Chapter Five of the thesis will ultimately argue for commitments in a legally binding form, setting precautionary standards and taking collective steps to ensure compliance by all Antarctic actors, particularly through strategic planning processes and departure state control.

⁷⁴ *United Nations Convention on the Law of the Sea*, opened for signature 10 December 1982. 1833 *United Nations Treaty Series* 3 (entered into force 16 November 1994).

⁷⁵ UNCLOS, Article 87.

⁷⁶ *Australia et al*, above n 11.

REGIONAL APPROACHES TO ANTARCTIC BIOSECURITY

“The issue of non-native species should be given the highest priority consistent with the high environmental standards set out in the Protocol; a ‘zero tolerance’ approach.”¹

“The fault for degradation of the Antarctic environment will lie neither in frail law nor in frail policies of preclusive restoration. The law and policy are clear. Rather, the fault for failure will lie in a lack of political will among the [AT Parties] to monitor activities, enforce compliance and compel compensation for liability.”²

2.1. INTRODUCTION

The arbitrary sectors that comprise territorial claims to the Antarctic area are not a boundary for NNS. Once established in an ecosystem, NNS can spread to other areas within the geophysical boundaries illustrated by the explosive spread of some NNS on sub-Antarctic islands.³ Thus, to effectively address biosecurity threats within geophysical regions, international and transboundary cooperation is essential.⁴ The ATS embodies this spirit of cooperation with sovereign interests put aside in the collective management of peaceful and scientific activities in the area south of 60° south latitude (AT area).⁵ Moreover, the underlying principles of the ATS provide a powerful catalyst for a biosecurity regime. The commitment to comprehensive protection of the environment in PEPAT, including planning activities to avoid damage to biodiversity and habitats,⁶ implies the need to take

¹ Australia, France and New Zealand, *A Work Program for CEP Action on [NNS]*, ATCM XXXII WP 05 (2009), 4, Recommendation 1.

² C C Joyner, ‘Fragile Ecosystems: Preclusive Restoration in the Antarctic’ (1994) 34 *Natural Resources Journal* 879, 902.

³ Y Frenot et al, ‘Biological invasions in the Antarctic: extent, impacts and implications,’ (2005) 80 *Biological Reviews* 50.

⁴ C Shine, N Williams and G Gündling, *A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species*, IUCN Environmental Policy and Law Paper No. 20 (2000) 32-3.

⁵ Contrasted with the Antarctic area south of the Convergence and the relevant boundary for the CCAMLR (see above Section 1.1, n3).

⁶ PEPAT, Article 2, Article 3(2)(iii)-(vi).

precautions to avoid introducing NNS.⁷ However, the provisions and tools within PEPAT fail to provide anything approximating the consistency or comprehensiveness of an effective domestic biosecurity framework. Outside the ATS, the regional tourism industry body IAATO employs mandatory decontamination standards on all their vessels, although do not strategically address how their activities might impact the spread of NNS. The following chapter will assess the regional biosecurity framework through an analysis of the ATS's provision for biosecurity and application to actors in the Antarctic area. Each of the tools available to AT Parties will be examined in a biosecurity context, appropriate to the three principal human actors on the continent; National Antarctic Programs, private tourist operators and the fishing industry.

2.1.1 FOUNDATIONS OF ANTARCTIC BIOSECURITY: A REGIONAL TREATY SYSTEM

Before addressing the adequacy of the ATS biosecurity framework, this section will introduce the ATS and evaluate its applicability to activities posing a biosecurity threat to the Antarctic environment. Essentially the ATS comprises a "...regime for governing human activities in the Antarctic."⁸ It is defined in PEPAT as: "the AT, the measures in effect under that Treaty, its associated separate international instruments in force⁹ and the measures in effect under those instruments."¹⁰ Although this exhaustively lists the formal aspect of the ATS, a number of other regional bodies and instruments have direct and indirect impacts on activity in the Antarctic.¹¹ The distinct parts of the ATS could be considered separate regimes, dealing with certain activities within a geographical area. However, it is the interrelation between all the components that gives the ATS its systemic nature.¹²

For biosecurity measures to be effective, they must be consistently and comprehensively applied to the various vectors of human activity.¹³ Any legal regime relies on some form of authority to legislate

⁷ B Mansfield and N Gilbert, 'Availability and Applicability of Legal Tools for Managing Non-native species' in M Rogan-Finnemore (ed), *Non-Native Species in the Antarctic Proceedings* (2008), 140.

⁸ C C Joyner, *Governing the frozen commons: the Antarctic regime and environmental protection* (1998), 23.

⁹ CCAS, CCAMLR and PEPAT.

¹⁰ PEPAT, Article 1(e).

¹¹ In particular, Information Papers ('IP') and Working Papers ('WP') submitted to the ATCM, Reports of the Meetings of Experts ('ME'), the Scientific Committee on Antarctic Research ('SCAR'), the Council of the Managers of National Antarctic Programs ('COMNAP'), IAATO, the Antarctic and Southern Ocean Coalition ('ASOC'), the AT Secretariat and the *Convention on the Regulation of Antarctic Mineral Resource Activity* (opened for signature on 25 November 1988, 27 *International Legal Materials* (1988) (not in force) ('CRAMRA')) which although unlikely to ever enter force, continues to influence the development of the ATS; E Cohen, *Handbook of the Antarctic Treaty System*, (2003) 189.

¹² D Vidas, 'The Antarctic Treaty System and the law of the sea: a new dimension introduced by the Protocol,' in O S Stoke and D Vidas (eds.) *Governing the Antarctic* (1996), 59.

¹³ Shine, above n 4, 1.

and enforce rules, yet jurisdiction remains one of the unsolved problems of the ATS.¹⁴ In the Antarctic area, the close link between jurisdiction and territorial sovereignty limits the extent that AT Parties can legislate and enforce a biosecurity regime. The sovereign disputes over the Antarctic area remain “frozen” under Article IV of the Antarctic Treaty and the measures of the AT are implemented on Parties on the basis of nationality.¹⁵ The rule of *pacta tertiis* excludes applying any biosecurity measures under the ATS on third parties without customary quality or erga omnes application.¹⁶ The application of any objective regime requires general acceptance of the international community of its objective application¹⁷ and there are continued opposition to the institutions of the ATS creating an objective regime.¹⁸ In addition, there are no signs that AT Parties wish to pursue this designation which implies nationality is the sole basis for jurisdiction in the AT area.¹⁹

2.1.1.1 LEGAL STATUS OF THE ANTARCTIC TERRESTRIAL AREA

The legal status of a geographic area establishes the boundaries for human interaction with the area and thus the biosecurity threat posed by human activities. Many sub-Antarctic areas are given natural reserve status that, in some examples, restricts entry to environmental managers and scientists examining human impact, thus significantly limiting exposure to NNS. Any interaction that is permitted is conditional on precautionary biosecurity measures.²⁰ However, the State’s capacity to afford an area precautionary protection is dependent on their territorial sovereignty over the area.

¹⁴ P J Beck, *The International Politics of Antarctica* (1986), 139.

¹⁵ Joyner, above n 8, 25.

¹⁶ *Vienna Convention on the Law of Treaties*, opened for signature 23 May 1969. 1155 *United Nations Treaty Series* 331, (‘VCLT’) Article 34. The “general rule is so well established that there is no need to cite extensive authority for it.” (L Oppenheim, R Y Jennings and A Watts, *Oppenheim’s International Law*, R Y Jennings, A Watts (eds.) (9th ed., 1992), 1260). For more on the application of AT principles to third parties see: U Nussbaum, ‘Legal status of Antarctic off-shore areas’, (1993) 6 *Antarctic and Southern Ocean law and policy occasional paper* 1; A Wyzomska, ‘Erga tertios effect of the Antarctic Treaty’ (1993) 6 *Antarctic and Southern Ocean law and policy occasional paper* 1; and D Rothwell, *The Polar Regions and the Development of International Law* (1996), 454-456.

¹⁷ I Brownlie, *Principles of public international law* (2008, 5th ed.), 11.

¹⁸ The General Assembly of the UN remains seized on the role the UN should have in managing activity on the Antarctic continent. During the latest discussion of the issue, Malaysia, the State that led objections to the ATS in the 1980s stated: “we maintain the United Nations...is the most appropriate authority to monitor, administer and regulate the various scientific and non-scientific activities in Antarctica.” United Nations General Assembly Records 60th Session, *Record of the 23rd meeting of the First Committee*, 1 November 2005. A/C.1/60/PV23; for an analysis of the UN’s consideration of Antarctica, see P Beck, ‘The United Nations and Antarctica, 2005: the end of the ‘Question of Antarctica’?’ (2006) 42 *Polar Record* 217, 226, [Figure 4].

¹⁹ E J Molenaar, ‘CCAMLR and Southern Ocean Fisheries,’ (2001) 16(3) *International Journal of Marine and Coastal Law* 479, 479-480.

²⁰ The minimum impact islands in the New Zealand Sub-Antarctic Islands; see Chapter 4, Section 4.2.1.1..

In international law, several approaches have been developed to deal with the legal status of territory.²¹ The traditional approach identifies the owner of the land: either no one²² or everyone.²³ Each regulates exploitation of the space by restricting to the first lawful taker in the former, or everyone in the latter. The traditional view places the Antarctic continent in the former category.²⁴ Seven sovereign States made claim to Antarctica before 1961,²⁵ three of which overlap.²⁶ Only five of the States mutually recognise each other's claims,²⁷ two claimants do not recognise any claims other than their own²⁸ and two states reserve the right to make future claims.²⁹ The cornerstone of the AT, Article IV, is designed to keep the status quo as of 1959.³⁰ Most scholars are of the opinion that no national claim to sovereignty has a sufficient basis in international law to allow for any form of territorial jurisdiction, meaning no single sovereign state can provide the area precautionary protection.³¹

If it is not owned by anyone, some argue it resembles a commons area similar to the high seas, open to exploitation by all.³² The extent to which this is an accurate description is questionable given the unresolved status of territorial claims.³³ The legal implication of this designation is not positive for the management of biosecurity threats. The "tragedy of the commons" predicts that finite commons' resources utilised by self interested actors tend towards collapse.³⁴ If the Antarctic is left open to exploitation, the model predicts rational, self-interested actors will attempt to maximise returns from scientific, mineral, aesthetic and living resources until the resources are no longer

²¹ Joyner, above n 8, 30.

²² Res Nullius is "the property of nobody," (B A Garner, (ed.), *Blacks Law Dictionary*, (9th ed , 2009), 1306); land not owned by anyone is thus referred to as Terra Nullius; Joyner, above n 8, 31.

²³ Res Communis is described as... "in the civil law, things common to all; that is, those things which are enjoyed and used by everyone, even in single parts, but never can be exclusively required as whole, e.g. light and air." (Garner, *ibid*, 1306) The high seas are an example.

²⁴ See Brownlie, above n 17, 255.

²⁵ All claim areas are sectors with a northern limit of 60° latitude and coming to a point at the South Pole with the exception of: Chile and Norway's claim with no Northern limit (and in the case of Norway including Peter I Island); Argentina (25°W to 74°W); Australia (160°E to 136°11'E; 142°2'E to 44°38'E); Chile (53°W to 90°W); France (142°2'E to 136°11'E); New Zealand (150°W to 160°E); Norway (44°38'E to 20°W); and the United Kingdom (20°W to 80°W); for more information on the basis of claims see: P J Beck, *A Continent in Search for a Sovereign*, (1984), 119-122.

²⁶ United Kingdom, Chile, and Argentina.

²⁷ Norway, Australia, New Zealand, United Kingdom and France.

²⁸ Chile and Argentina.

²⁹ United States and Russia.

³⁰ Beck, above n 14, 116.

³¹ Joyner, above n 8, 20; Nussbaum, above n 14, 15.

³² S J Buck, *The Global Commons: an introduction* (1998), 14.

³³ *Ibid*.

³⁴ G Hardin, 'The Tragedy of the Commons' (1968) 162 *Science* 1243.

viable.³⁵ Moreover, they may do so without taking precautions against biosecurity if it is likely that other operators will not take precautions and thus gain a competitive advantage. A foil to the tragedy of the commons is contractual, collective management. Self-interested actors forming a collective arrangement, like the ATS, to mitigate against biosecurity threats in unison allows for a commons area to be sustainably exploited. In the domestic framework this is provided by the State. Biosecurity plays an essential role in the economy by preventing the spread of disease and pests that threaten key crops and livestock. Although individuals can benefit from the spread of NNS, the State, as a self interested actor, takes coordinated measures to prevent the spread of harmful NNS to protect its resources as a whole.³⁶ For the tourist and research sector, the pristine environment is valuable and taking biosecurity measures collectively through the ATS is analogous to the State protecting its own resources.

The most significant difficulty that sovereign states face in implementing an effective biosecurity framework is the fragmentation and inconsistency across agencies and institutions responsible for implementing biosecurity.³⁷ With 28 Consultative Parties to the AT, a further 10 States with tourist vessels flying their flag in the Southern Ocean in the 2007/8 summer season and 4 further States with vessels listed on as illegal, unreported and unregulated under CCAMLR's notification process, policy-makers in the Antarctic area face numerous biosecurity regimes that address or fail to address the same theme. The fragmented aspect of environmental management in the Antarctic area is a direct result of the approach of the ATS towards jurisdiction. The default jurisdictional approach of the AT focuses on nationality, without "prejudicing the respective positions of the Contracting Parties."³⁸ Article VIII of the AT lays out a limited formula: jurisdiction in the AT area stems from the individual's nationality in the case of inspectors and scientific personnel "exchanged under [the Treaty]".³⁹ Expeditions, stations and landed tourists follow something analogous to flag state jurisdiction;⁴⁰ claimant states agree to avoid enforcing territorial jurisdiction.⁴¹ The AT promotes a

³⁵ Joyner, above n 8, 29.

³⁶ See below Chapter 4, Section 4.1.

³⁷ Shine, above n 4, 37.

³⁸ AT, Article VIII (2).

³⁹ Under AT, Article III (1)(b); C.f. this is a very limited jurisdictional scope, specifying to only a certain category of activity, however its practical application is almost universal, except in regards to activities that traditionally fall under the UNCLOS. F O Vicuña, 'Port State Jurisdiction in Antarctica: A New Approach to Inspection, Control and Enforcement' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000), 46.

⁴⁰ AT, Article VII (5).

⁴¹ Vicuña, above n 39, 46; c.f. all claimant states regulate based on territorial jurisdiction but do not enforce those provisions; K Bastmeijer, 'Implementing PEPAT Domestically' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000), 297-298.

pragmatic approach; any dispute met with immediate consultation “with view to reaching a mutually agreeable solution.”⁴² The ATCM also has the capacity to consider measures in respect of jurisdiction questions.⁴³ In practice, management approaches focus on the Parties’ jurisdictional capacity to regulate their own nationals.⁴⁴ Before the passage of PEPAT, permits under the 1964 Agreed Measures,⁴⁵ for both the conservation of Antarctic marine living creatures and protected areas, were delegated to “an appropriate authority”⁴⁶ defined as any person authorised by a Participating Government to issue permits under these Agreed Measures. The deliberate ambiguity in this statement left open the possibility of that authority being the State that asserted territorial jurisdiction.⁴⁷ However, subsidiary measures highlight Treaty Parties’ national jurisdiction and no attempt at territorial jurisdiction has been enforced. Without exception, states are responsible via domestic legislation for implementing the regulations of the ATS on their own nationals in Antarctica.

Nevertheless, developments in the concept of the commons since the negotiation of the AT have some relevance to the governance of the Antarctic.⁴⁸ The common heritage of mankind principle dedicates certain areas beyond the limits of national jurisdiction to peaceful purposes and scientific freedom.⁴⁹ Exploration, exploitation and use of the non-living resources of the commons must also benefit future generations and be shared with all nations.⁵⁰ The International Seabed Authority, created under UNCLOS, is an example of an international institution that provides the support in implementing the CHM principle.⁵¹ However, the focus of this concept has been an equitable sharing of exploitation, rather than retaining benefits for future generations.⁵² Biosecurity measures may be more consistently applied and enforced with a central law making authority, but a focus on global exploitation would increase NNS risks associated with increased human exposure and potentially weakened natural biodiversity.

⁴² Beck, above n 14, 139.

⁴³ AT, Article IX 1(e).

⁴⁴ F O Vicuña, *Antarctic mineral exploitation: the emerging legal framework* (1998), 98.

⁴⁵ *Agreed measures for the Conservation of Antarctic Flora and Fauna*, attached to Recommendation III-VIII adopted at ATCM III (1964), opened for signature June 2 1964 (entered into force 1 November 1982) (‘Agreed Measures’)

⁴⁶ Ibid, Article 2(c).

⁴⁷ Vicuña, above n 39, 46.

⁴⁸ Joyner, above n 8, 33.

⁴⁹ K Baslar, *The concept of the common heritage of mankind in international law* (1998), 115-6.

⁵⁰ Joyner, above n 8, 33; P Birnie and P Boyle, *International Law and the Environment* (2nd ed, 2002), 143.

⁵¹ Ibid.

⁵² Ibid.

A more useful construct was proposed by Australia and France when they argued for the Antarctic area to be put aside as a World Park and governed by a separate institution in the preliminary negotiations for PEPAT.⁵³ The idea of a “public heritage of humankind”,⁵⁴ where an institution restricts exploitation for the benefit of present and future generations, provides a useful basis for a biosecurity system.⁵⁵ This approximates the protection afforded some sub-Antarctic areas. Human interaction with the area can be strictly controlled with the purpose of protecting the pristine quality of the continent for future generations.⁵⁶ However, AT Parties did not embrace the concept: the natural reserve accepted in the final formulation of PEPAT retains jurisdiction based on nationality and rejected institutionalisation of the ATS.⁵⁷ A substantive analysis of these concepts is outside the scope of this thesis.⁵⁸ It is sufficient to note that scientific, aesthetic and wilderness values protected by the ATS, linked by institutionalised collective management, create a unique legal framework. PEPAT provides that exploitation for any purpose should involve no significant or lasting damage to the environment creating a firm foundation for an effective biosecurity framework. However, the implementation of these principles has varied⁵⁹ and the “jurisdictional vacuum” that existed in the wake of the AT negotiations essentially remains unchanged.⁶⁰

2.1.1.2 LEGAL STATUS OF THE ANTARCTIC MARINE AREA

UNCLOS contains the core international law regulating activities in the sea.⁶¹ Under UNCLOS, there are five general forms of maritime area, three of which allow states to regulate activity next to their territory.⁶² Despite the reservation of high seas freedoms in the AT,⁶³ subsequent practice confirms

⁵³ Australia, Belgium, France and Italy, Indicative Draft of a Convention for the Comprehensive Protection of the Antarctic Environment, SATCM XI-1 doc. XI (1990).

⁵⁴ See: Joyner, above n 8, 34; K D Suter, *Antarctica: Private Property or Public Heritage* (1991), 169-81.

⁵⁵ S K Chopra, “Antarctica as a Commons Regime: A Conceptual Framework for Cooperation and Coexistence,” in Joyner and Chopra, eds, *The Antarctic Legal Regime* (1988), 169.

⁵⁶ See for example: M S de Villiers, *et al*, ‘Conservation Management at Southern Ocean Islands: towards the Development of Best-Practice Guidelines’ (2005) 75(2-3) *Polarforschung* 113, 116.

⁵⁷ C Redgewell, ‘Environmental Protection in Antarctica: the 1991 Protocol’ (1994) 43 *International and Comparative Law Quarterly* 599, 606.

⁵⁸ For a thorough discussion see: Joyner, above n 8.

⁵⁹ Redgewell, above n 54, 604; Vicuña, above n 39, 45.

⁶⁰ Vicuña, above n 39, 46.

⁶¹ Vidas, above n 12, 78; C C Joyner, ‘The Antarctic Treaty and the law of the sea: fifty years on,’ (2009) 46 *Polar Record* 1, 15.

⁶² D K Anton, ‘Australian Jurisdiction and Whales in Antarctica: Why the Australian Whale Sanctuary in Antarctic Waters Does Not Pass International Legal Muster and is also a Bad Idea as Applied to Non-Nationals,’ (2008) 11 (3 & 4) *Asia Pacific Journal of Environmental Law* 171, 173.

⁶³ AT, Article VI; c.f. application is limited to “south of 60° latitude, including all ice shelves.”

the AT's application to the marine areas within the AT area.⁶⁴ However, neither the ATS nor UNCLOS explicitly categorise the legal status of marine areas in the AT area.⁶⁵ Wherever ships are, they are subject to their flag state's jurisdiction.⁶⁶ UNCLOS allows coastal states to directly protect their marine environments, rather than rely on the practise of foreign flag states. A liberal interpretation of Article IV(2), which is also invoked in CCAMLR, does not preclude states asserting sovereign rights over maritime zones. The Article only refers to prohibiting enlarged or new claims to "territorial" sovereignty and arguably, the extension of marine zones is automatic by the operation of international law, rather than an "enlargement" of a claim.⁶⁷ Article VI of the AT reserving States rights under international law "with regard to the high seas within that area" does not necessarily exclude the existence of other maritime zones.⁶⁸ However, for the 187 States that do not recognise any claims to Antarctica; there is no legitimate basis for maritime zones.⁶⁹ Until undisputed territorial sovereignty is accepted, the flag state remains the only legitimate authority over the Antarctic marine environment.⁷⁰

Despite this, most claimant States assert jurisdiction over maritime areas, including the territorial sea, contiguous zone, exclusive economic zone ('EEZ') and the continental shelf extending from their claim.⁷¹ The territorial sea, contiguous zone, and continental shelf, extend automatically from a state's territory and does not require any additional action.⁷² In contrast, UNCLOS requires a state to declare an EEZ before it is effective and register any extensions of the continental shelf beyond 200

⁶⁴ VCLT, Article 31(3)(b) (subsequent practise establishes the proper interpretation of a Treaty); Anton, above n 59, 177, c.f. some commentators assert this provision excludes the AT's application to marine areas, A D Watts, 'The Antarctic Treaty as a Conflict Resolution Mechanism' in Polar Reserve Board, National Research Council (ed.) *Antarctic Treaty System: An Assessment* (1986), 69.

⁶⁵ Wyrozumska, above n 14, 13.

⁶⁶ UNCLOS, Article 94. For more discussion of this point, see Chapter 3.

⁶⁷ P Vigni, 'Antarctic Maritime Claims: "Frozen Sovereignty" and the Law of the Sea' in A. G. Oude Elferink, and D. R. Rothwell (eds.), *The Law of the Sea and Polar Maritime Delimitation and Jurisdiction* (2001), 91-96.

⁶⁸ A Homan, 'Maritime Zones in Antarctica,' (2006) 11 *Australian and New Zealand Maritime Law Journal* 69, 72.

⁶⁹ C C Joyner, 'The Exclusive Economic Zone and Antarctica' (1981) 21(4) *Virginia Journal of International Law* 691, 725; Anton, above n 59, 177; with the exception of the marine areas based on the sub-Antarctic islands with undisputed sovereignty (see below); Homan, *ibid*, 71.

⁷⁰ A D Hemmings, 'Problems Posed by Attempts to Apply a Claimant's Domestic Legislation Beyond its Own Nationals in Antarctica,' (2008) 11 (3 & 4) *Asia Pacific Journal of Environmental Law* 208.

⁷¹ For example: W M Bush, 'Australian Implementation of the Environmental Protocol' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000), 310-311; M L Carvalho and P Julio, 'Implementation of the Antarctic Environmental Protocol by Chile: History, Legislation and Practice' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000), 340-344; B Njåstad, 'Norway: Implementing the Protocol on Environmental Protection' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000), 388; K Bastmeijer, *The Antarctic Environmental Protocol and its Domestic Implementation* (2003), 126-127.

⁷² UNCLOS, Article 2; 33; 74.

nautical miles with the Commission on the Limits on the Continental Shelf ('CLCS').⁷³ Article IV(2) of the AT arguably does not apply to Antarctic maritime zones as the Article only prevents new claims to "territorial sovereignty" and all the zones but the EEZ extend automatically from the previously asserted claims.⁷⁴ However, the reservation of the freedom of the high seas may restrict the marine zones to those established before the AT came into force.⁷⁵ This has not prevented the claimant states legislating for the marine areas, declaring EEZ and making claims to the CLCS under Article 76(8) of UNCLOS.⁷⁶ In addition, Australian courts have controversially confirmed the application of the Australian EEZ off the Australian Antarctic Territory ('AAT') in reference to Japanese whaling vessels.⁷⁷ Although potentially permitting claimants to enforce biosecurity provisions within the AT area, the collective management of Antarctica relies on Article IV's diffusion of the sovereignty disputes.⁷⁸ The balance between claimant states retaining their claims and the spirit of cooperation that embodies the ATS is inconsistent with claimant states enforcing their claims. A biosecurity regime would benefit from a sovereign state enforcing quarantine provisions but the implications for future human activity in the area could increase the risks of NNS introduction in the long term, especially if the environmental principles of PEPAT were abandoned.⁷⁹ However, the restriction certainly limits the application of any regional biosecurity regime to non-parties to the AT.

Maritime jurisdiction is somewhat complicated by the sub-Antarctic islands that have marine areas intruding into the Antarctic area.⁸⁰ As the sovereign authority over some of these areas is undisputed, the extension of maritime areas is uncontroversial.⁸¹ Consensus based decision making

⁷³ UNCLOS, Article 76, para 8; above n 60, 172.

⁷⁴ Watts, above n 64, 69.

⁷⁵ Anton, above 62, 172.

⁷⁶ France, Australia, Norway, the United Kingdom, Argentina and New Zealand all submitted to the CLCS; CLCS Website, http://www.un.org/Depts/los/clcs_new/clcs_home.htm, accessed 10/11/2008; In addition, Australia declared an EEZ: *Seas and Submerged Lands Act 1973 Proclamation*, Commonwealth of Australia Gazette (Special), No. S290, Friday, 29 July 1994 (1994); Chile has submitted preliminary data.

⁷⁷ *Humane Society International Inc v Kyodo Senpaku Kaisha Ltd* (2008) FCA 3. For analysis of both sides of the debate, see (2008) 11 Asia Pacific Journal of Environmental Law: Special Issue Japanese Whaling in Antarctica.

⁷⁸ Watts, above n 65, 135-6.

⁷⁹ This point will be analysed in more detail in comparing the approach of the Australian and New Zealand authorities to their Antarctic activities and their sub-Antarctic territories in Chapter 4.

⁸⁰ The EEZ of several Sub-Antarctic Islands extend south of the Antarctic Convergence (Heard and McDonald Islands (Australia), Kerguelen and Crozet Islands (France), Bouvetøya Island (Norway), Prince Edward and Marion Islands (South Africa) and South Georgia and the South Sandwich Islands and Shag Rocks (claimed by Argentina and the United Kingdom but under the effective control of the latter); and the declared continental shelf of Heard Island extends into the AT area. E J Molenaar, 'CCAMLR and Southern Ocean Fisheries,' 16 (3) *The International Journal of Marine and Coastal Law* 465, 479-480; A D Hemmings and T Stephens (2009) 'Australia's Extended Continental Shelf: What Implications for Antarctica?' 20(1) *Public Law Review* 9, 11.

⁸¹ Hemmings and Stephens, *ibid*, 14.

allows for any affected State to veto any biosecurity measure or resource allocation that offends against its sovereignty. This characteristic is evoked by the Final Act of CCAMLR and expressly permits any sub-Antarctic State to adopt conservation measures which vary from those provided by CCAMLR in relation to their maritime zones.⁸² Although this statement does not have binding status, it has been respected by the Commission and reflects common practice in Regional Fisheries Management Organizations ('RFMO') in relation to coastal states with maritime zones within or adjacent to their regulatory area.⁸³ As there is no such compromise in PEPAT, the one declared continental shelf that extends into the AT area must conform with the ATS in relation to that area or amend or repeal its ratifying legislation.⁸⁴

2.1.1.3 SUMMARY

A jurisdictional system that is based on nationality necessarily precludes the application of any biosecurity measures to third parties that exist outside of the ATS. The applicability of customary law through UNCLOS and other marine instruments will be examined in more detail in the context of instruments outside the ATS in Chapter 3. More significantly as most activity in the Antarctic is carried out by AT Parties; it leads to some significant discrepancies in the manner of implementation.⁸⁵ Consistency is required for any effective response to a "messy, frustrating, depressing and unpredictable" subject like biosecurity.⁸⁶ However, the ATS provides a significant network of measures to prevent, monitor for and respond to NNS, particularly in relation to the most intrusive human activity on the continent, the support of scientific activity.⁸⁷

2.1.2 ADEQUACY OF LEGAL INSTRUMENTS AND INSTITUTIONS

Although the environmental and scientific values underlying the ATS invoke the consideration of NNS, there is minimal substantive provision for biosecurity in the associated instruments or measures to ensure compliance with the few measures that are present. Moreover, despite the legal framework for the system providing for the consideration of environmental issues, it does not

⁸² CCAMLR, Statement by the Chairman of the Conference on the Conservation of Antarctic Marine Resources on 19 May 1980, (1980) < http://www.ccamlr.org/pu/e/e_pubs/bd/pt1.pdf > at 2 June 2009.

⁸³ E J Molenaar, above n 80, 480.

⁸⁴ Hemmings and Stephens, above n 80, 7.

⁸⁵ K Bastmeijer, above n 71, 423.

⁸⁶ C Bright, *Life Out of Bounds: Bioinvasion in a Borderless World* (2000), cited in Shine, above n 4, xi.

⁸⁷ Y Frenot *et al*, 'Antarctic and Subantarctic Biological Invasions: Sources, Extents, Impacts and Implications' in M Rogan-Finnemore (ed), *Non-Native Species in the Antarctic Proceedings* (2008), 78.

provide adequately for the cooperative management of cumulative impacts including the capacity to respond proactively or reactively to the introduction of NNS.

2.1.2.1 INSTITUTIONAL FRAMEWORK: THE ANTARCTIC TREATY AND MEETINGS OF THE PARTIES

The AT provides a loose set of themes, norms and procedures for governing the AT area. Several aspects suit a biosecurity regime. The requirement to cooperate and exchange information is central to the ATS and necessary for reducing the environmental risks of any areas that are shared.⁸⁸ The instrument also introduces an inspection process “to promote the objectives and ensure the observance of the provisions of the present treaty.”⁸⁹ However, the focus of the instrument and inspection process is peaceful, scientific utility of the continent and not environmental protection. The AT defines the AT area as a demilitarised “continent of science” that “shall be used for peaceful purposes only.”⁹⁰ Although NNS could reduce the value of the continent for science, scientific freedom is not an appropriate basis for a biosecurity framework. Membership is open to all States, but participation in decision making is conditional on engaging in Antarctic research activity.⁹¹ The only mention of the environment or biodiversity in the text of the agreement is in relation to Parties meeting to decide on the “preservation and conservation of living resources in Antarctica”.⁹² The commitment to consensus-style decision making retains the sovereign discretion of State parties, requiring open cooperation. This promotes full consideration of the stakeholders involved but also limits the capacity of the ATS to introduce a comprehensive biosecurity framework and enforce the provisions that do exist. However, the instrument is also flexible⁹³ with provision for amendment and adoption of subsidiary instruments.⁹⁴

Article IX of the Treaty requires ATPs to “meet...at suitable times and places,” for the purpose of “exchanging information, consulting together on matters of common interest pertaining to Antarctica” and, most importantly formulating, considering and recommending to their

⁸⁸ AT, Article III; IUCN Species Survival Commission Invasive Species Specialist Group, *IUCN Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species*, approved by 51st meeting of the IUCN Council (2000) (‘IUCN Biosecurity Guidelines’), 9.1.

⁸⁹ AT, Article VII(1).

⁹⁰ AT, Article II; Article III.

⁹¹ AT, Article IX.

⁹² AT, Article IX(1)(f).

⁹³ Suter, above n 51, 22.

⁹⁴ AT, Article IX; Article XII.

governments, “measures in furtherance of the principles and objectives of the treaty.”⁹⁵ The limitations of the subsidiary instruments are significant in the context of biosecurity. The meetings include representatives of the consultative and non-consultative parties, observers,⁹⁶ invited experts⁹⁷ and guests.⁹⁸ The measures only become effective when approved by all ATCP governments and can include any matter of common interest.⁹⁹ Whether they have legally binding status, beyond the plain language interpretation of “recommend[ations] to their governments”¹⁰⁰ in the text of the AT, is questionable.¹⁰¹ The uncertainty around legal status led to lengthy delays in some recommendations becoming effective and the proliferation of categories of recommendation, prompting AT Parties to rationalise the system in 1995.¹⁰² “Measures” are explicitly legally binding as reflecting the intentions of the original drafters of the AT,¹⁰³ however two other categories of recommendation were introduced. “Decisions” concern internal organisational matters and become operative upon their adoption at an ATCM, although their status is legally uncertain with most ratifying legislation unfamiliar with the term.¹⁰⁴ “Resolutions” are nonbinding, hortatory texts.

In addition, Annex V of PEPAT introduced a fast track procedure for management plans, which although annexed to a measure, come into effect 90 days after being approved in an ATCM, unless the measure specifies otherwise.¹⁰⁵ On balance the process of adopting measures has been sufficient to address the issues arising in the Antarctic area.¹⁰⁶ However, the result is sometimes cumbersome with continuing inconsistencies in the methods of adopting and ensuring compliance with measures

⁹⁵ AT, Article IX(1)(f); Rothwell, above n 14, 92.

⁹⁶ SCAR, CCAMLR and COMNAP; ATCM, *Revised Rules of Procedure*, ATCM XXXI Decision 1(Annex) (2008) (‘ATCM Rules of Procedure’), Rule 2.

⁹⁷ Invited international organisations having a scientific or technical interest in Antarctica, decided at the end of every ATCM; ATCM Rules of Procedure, 39-45; at ATCM XXXII, ASOC, IAATO, the International Hydrographic Organisation (IHO), the International Programme Office of the International Polar Year (IPO-IPY), the IUCN and the United Nations Environmental Program (UNEP) participated as invited experts and in addition, the IMO, Intergovernmental Oceanographic Commission (IOC); ATCM, *Final Report of ATCM XXXII* (2009), [3] and 701.

⁹⁸ Although not formally included in the rules of procedure, Malaysia attended as a guest in 2008 and 2009; ATCM, *Final Report of ATCM XXXII* (2009), 701.

⁹⁹ AT, Article IX(3).

¹⁰⁰ AT, Article IX(1).

¹⁰¹ See Bush (vol 1), 96-7; Watts, *International Law*, 25; C C Joyner, ‘Recommended measures under the Antarctic Treaty: Hardening Compliance with Soft International Law’ (1998) 19 *Michigan Journal of International Law* 401; Rothwell, above n 14 94.

¹⁰² Recommendations divided into Measures, Decisions and Resolutions, ATCM XIX, Decision 1 (1995); Final Report of ATCM XIX (1995) [37]

¹⁰³ Rothwell, above n 16, 100.

¹⁰⁴ P Vigni, ‘The Secretariat of the Antarctic Treaty: achievements and weaknesses three years after its establishment’ in G. Triggs, and A. Riddell, *Antarctica: legal and environmental challenges for the future* (2007), 20.

¹⁰⁵ PEPAT, Annex V, Article 6(1); ATCM Rules of Procedure (2008), 26.

¹⁰⁶ Joyner, above n 101, 94.

and decisions.¹⁰⁷ A consensus-based system, requiring universal acceptance and internal ratification of measures, limits the capacity for AT Parties to proactively provide for environmental issues. The Antarctic Secretariat partially addresses this gap allowing for intersessional information exchange, monitoring and organisation but does not have international authority or decision making power with respect to issuing regulatory acts.¹⁰⁸ No procedure exists for intersessional adoption of a subsidiary instrument, hindering the capacity of States to respond to new and pressing issues.¹⁰⁹

2.1.2.2. A FOCUS ON ENVIRONMENTAL PROTECTION

PEPAT supplements the AT¹¹⁰ by integrating the many disparate environmental measures throughout the Treaty system into an environmentally focussed framework for the regulation of human activity in the AT area.¹¹¹ The instrument stops short of implementing the “World Park” concept discussed above but the environmental principles under Article 2 and 3 of PEPAT provide the ideological foundation for biosecurity in the area. Under PEPAT, AT Parties must consider the comprehensive protection of the Antarctic environment and its dependent and associated ecosystems, as well as the inherent aesthetic, wilderness and scientific values of the area. Invasive NNS have the potential to threaten the protected “Antarctic environment and dependent and associated ecosystems” by definition¹¹² and ecosystem based management is the most appropriate basis for biosecurity.¹¹³ The extent an NNS introduction affects the wilderness value of an area depends on the assessment of wilderness.¹¹⁴ Some authors expressly include the concept of “intact native ecosystems” in a wilderness value and consequentially, absence of NNS.¹¹⁵ However, the practical application of protecting wilderness values has been given very little attention at CEP

¹⁰⁷ Bastmeijer, above n 71, 446.

¹⁰⁸ Vigni, above n 104, 36.

¹⁰⁹ Ibid.

¹¹⁰ PEPAT, Article 4 (1), “This Protocol shall supplement the Antarctic Treaty and shall neither modify nor amend that Treaty.”

¹¹¹ D Lyons, ‘Environmental Impact Assessment in Antarctica under the Protocol on Environmental Protection’ (1997) 29 *Polar Record* 223 1993, 113.

¹¹² PEPAT, Article 2; 3(1); 3(2)(a).

¹¹³ See definition in Chapter 1.

¹¹⁴ A working definition of wilderness in the Antarctic is suggested by Codling: ‘Any part of the Antarctic in which neither permanent habitation nor any other permanent evidence of present or past human presence is visible’; R Codling, ‘Wilderness and aesthetic values of Antarctica,’ (2001) 7 *Polar Record* 37, 38.

¹¹⁵ G Aplet, J Thomson and M Wilbert, ‘Indicators of Wildness: Using Attributes of the Land to Assess the Context of Wilderness’, (2000) 2 *USDA Forest Service Proceedings* RMRS-P-15, 90.

meetings or at ATCMs.¹¹⁶ Moreover, potentially impacts the “aesthetic value” of an area by changing the appearance of the natural environment.¹¹⁷ However, in some cases the presence of an NNS arguably benefits the aesthetic value complicating application.¹¹⁸ The application of a strict precautionary approach to activity related to mineral resources¹¹⁹ also eliminates the biosecurity threats posed by potential prospecting and extraction operations.¹²⁰ Although the principles form a useful background to environmental protection, more substantive obligations are necessary to minimise risks associated with NNS.¹²¹ The article is excluded from the scope of the Arbitration Annex¹²² and some states have not given the principles any legal effect in their ratifying legislation.¹²³ However, the adoption of environmental protection as a central principle underlying conduct indicates the capacity of the ATS to adapt to new priorities.¹²⁴ The provisions certainly indicate biosecurity is within the scope of the ATS and Article 9 of PEPAT reinforces the flexibility of the ATS, allowing for the adoption or amendment Annexes with a fast track approval process. Amendment or modification of an Annex becomes effective one year after the close of the ATCM at which it was adopted.¹²⁵

One of the most important features introduced by PEPAT to ensure flexibility and proactive environmental management is the Committee for Environmental Protection (“CEP”). The CEP has the express mandate to advise on “the need for additional measures” under PEPAT and “means of minimising or mitigating environmental impacts of activities in the [AT] area”.¹²⁶ However, it is limited in its utility to a biosecurity regime. Initial proposals in the negotiations to assemble a

¹¹⁶ K Bastmeijer, ‘Managing Human Activities in Antarctica: Should Wilderness Protection Count?’ (2005) 13 *New Zealand Yearbook of International Law* 335.

¹¹⁷ R Summerson and M J Riddle, ‘Assessing Wilderness and Aesthetic Values in Antarctica’ in W. Davison, C. H. Williams, and P. Broady (eds.), *Antarctic Ecosystems: Models for Wider Ecological Understanding* (2000).

¹¹⁸ For example, reindeer in South Georgia are arguably beneficial for aesthetic values; N Leader-Williams, D W H Walton and P A Prince, ‘Introduced Reindeer in South Georgia – A Management Dilemma’, (1989) 47 *Biological Conservation* 11.

¹¹⁹ PEPAT, Article 7; except in relation to scientific research, Bastmeijer, above n 39, 299.

¹²⁰ Potential interactions between mining’s impact on ecosystems and invasive NNS has been discussed in relation to estuaries: M J Kennish, ‘Environmental threats and the environmental future of estuaries,’ (2002) 29 *Environmental Conservation* 1.

¹²¹ Shine, above n 4, 23.

¹²² Redgewell, above n 57, 614.

¹²³ For example: *Antarctic Science, Tourism and Conservation Act of 1996* (United States) Public Law No.104-227, *Statutes*, vol 110, section 3034; C C Joyner, ‘The United States: Legislation and Practice in Implementing the Protocol’ in D Vidas (ed.), *Implementing the Environmental Protection Regime for the Antarctic* (2000), 420-422.

¹²⁴ O S Stokke, and D Vidas, *Governing the Antarctic: The effectiveness and legitimacy of the Antarctic Treaty System* (1996), 433.

¹²⁵ PEPAT, Annex I, Article 8; Annex II, Article 9; Annex III, Article 13; Annex IV, Article 15; Annex V, Article 12; Annex VI, Article 13.

¹²⁶ PEPAT, Article 12(c),(e).

“Permanent Committee for the Protection of the Antarctic Environment,”¹²⁷ similar to the regulatory committees created under CRAMRA, with extensive enforcement, inspection and monitoring responsibilities did not meet the approval of all of the Parties.¹²⁸ The CEP is a purely advisory body charged with liaising with relevant organisations¹²⁹, providing advice and formulating recommendations on a number of environmental issues relevant to PEPAT.¹³⁰ By restricting the CEP, Parties overlooked the impact human activity has in the Antarctic area and limits the potential for effectively implemented environmental protection.¹³¹ While the advisory body can assess risks, evaluate and advocate potential biosecurity measures, it cannot legislate or enforce those measures without approval through the ATCM and implementation by State parties. Moreover, the composition of the body with delegates from each AT party limits its capacity to independently analyse environmental issues.¹³² The CEP has also been charged with a rolling review of the Annexes, although the difficulties in reaching a consensus, limit the capacity of the CEP to make any significant changes.¹³³ Whether PEPAT in its current form can be effectively applied to a biosecurity regime requires a focus on the various tools and institutions PEPAT integrates to ensure environmental protection.

2.1.3 SUMMARY

Despite the environmental focus of PEPAT, the ATS is limited in its capacity to apply an effective biosecurity regime. Disputed sovereignty and rule by consensus both paralyse certain measures and empowers Treaty parties to independently govern Antarctic activities, complicating the application of environmental principles. The lack of an applicable jurisdictional formula or environmental institution with legal personality limits the capacity of AT Parties to enforce any measures. However, the underlying principles of the ATS, particularly Article 3 of PEPAT, implicitly provide for a biosecurity regime. The relevant provisions of PEPAT applicable to the major human activity on the continent are limited in their application to biosecurity.

¹²⁷ Australia, *et al*, above n 51.

¹²⁸ Redgwell, above n 55, 611.

¹²⁹ *Ibid*.

¹³⁰ PEPAT, Article 12(1).

¹³¹ Redgwell, above n 55, 612.

¹³² *Ibid*, 607.

¹³³ Australia, *Annex II: Finalising the Review*, ATCM XXII WP 39 (2009), 11.

2.2. NATIONAL ANTARCTIC PROGRAMS AND BIOSECURITY

Chapter 1 of this thesis illustrates that scientific activity in the Antarctic poses a considerable biosecurity threat to the Antarctic environment. This section evaluates whether tools and mechanisms under the ATS address biosecurity risks by dissecting the provisions required by PEPAT to protect the Antarctic environment. PEPAT prescribes considering environmental impacts in the planning of activity, including requiring environmental impact assessments for new or changed activities, permits for introducing NNS and certain interactions with protected areas and indigenous species, regulating the disposal of waste and marine pollution and proactively planning for environmental emergencies. PEPAT's compliance measures rely on information sharing and open cooperation. Impact assessments of activities deemed to have a "more than minor or transitory impact" are shared with other parties for consultation, national reports record the measures taken by AT Parties to implement PEPAT and an open inspection regime allows AT Parties to confirm compliance. To Although biosecurity is invoked sporadically through the system, there is a distinct lack of strategic management that limits the systems effectiveness at managing the risks posed by NNS.

2.2.1 PLANNING ACTIVITIES IN THE ATS TO AVOID THE INTRODUCTION OF NNS

PEPAT creates an express obligation to give careful consideration to threats to biodiversity and habitats in the planning of activities. Article 3 of PEPAT stipulates that activities in the AT area should be planned and conducted so to avoid: "detrimental changes in the distribution, abundance, and productivity of species and populations of species of fauna and flora¹³⁴; further jeopardy to endangered and threatened species and populations of such species¹³⁵; and degradation of, or substantial risk to, areas of biological, scientific, historic, aesthetic or wilderness significance."¹³⁶ As the introduction of NNS has been identified within the ATS as one of the greatest threats to biodiversity,¹³⁷ the provision creates an obligation on Parties to assess the risks of their activities introducing NNS and take action to minimise or eliminate the risks.¹³⁸ One of the difficulties with assessing the risks from NNS is the lack of baseline information and information on the potential

¹³⁴ PEPAT, Article 3(1)(iv)

¹³⁵ PEPAT, Article 3(1)(v)

¹³⁶ PEPAT, Article 3(1)(vi)

¹³⁷ Mansfield and Gilbert, above n 7, 140-1.

¹³⁸ Ibid.

threats associated with NNS but PEPAT also provides for the gathering of information on the “cumulative impacts of an activity, both by itself and in combination with other activities in the AT area.”¹³⁹ However, as the next sections will demonstrate, the elaborated planning processes prescribed by PEPAT have limited applicability for biosecurity.

2.2.1.1. THE GATEWAY INTO ANTARCTICA: EIA

Article 8 of PEPAT states that “...any activities undertaken in the AT area pursuant to scientific research programs, tourism and all other governmental and nongovernmental activities in the AT area for which advance notice is required under Article VII(5) of the AT...” are subject to assessment procedures set out in Annex I of PEPAT. The EIA is the “sole gatekeeper” to scientific and logistical activity in the Antarctic area and is the only express mechanism encouraging AT Parties to limit activity in the Antarctic area.¹⁴⁰ EIA first emerged as a legislative tool in the United States¹⁴¹; the provisions require operators to assess the environmental impacts of activity before any decision is made to proceed with that activity.¹⁴² One of the main benefits of the EIA process is its wide utility. Since its inception, 200 systems for assessing environmental impacts have been introduced, making the EIA one of the most widely implemented tools for environmental monitoring.¹⁴³ AT Parties can thus limit the scope of activity in the Antarctic in a reasonably consistent manner, as the structure of the system will be familiar. Unfortunately, the manifestation of EIA under Annex I of PEPAT limits its capacity to address biosecurity threats in the planning of conduct. The purpose of PEPAT, Article 8 and Annex I is to assess the potential impact of activities on the Antarctic environment and associated and dependent ecosystems the “planning and conduct” of all Antarctic activities.¹⁴⁴ The process is designed for assessing changes in activity or new events, promoting the consideration of NNS in relation to projects that may have a high NNS risk. However, the threshold for engaging in more extensive analysis does not appropriately account for the variable nature of biosecurity threats

¹³⁹ PEPAT, Article 3(c)(ii).

¹⁴⁰ A D Hemmings and R Roura, ‘A square peg in a round hole: fitting impact assessment under the Antarctic Environmental Protocol to Antarctic tourism’ (2003) 21(1) *Impact Assessment and Project Appraisal* 15, 21.

¹⁴¹ *National Environmental Policy Act* 1970 42 U.S.C. § 4321 (United States).

¹⁴² T Koivurova, *Environmental Impact Assessment in the Arctic* (2002), 132.

¹⁴³ O D Harrop and A J Nixon, *Environmental Assessment in Practice* (1999), 2.

¹⁴⁴ PEPAT, Article 3(1)(c).

and the provisions only include limited guidance on how to apply an EIA to decision making.¹⁴⁵ Indeed, there is no explicit mention of a need to consider specific threats, like NNS, in the Annex.

The Guidelines for EIA in Antarctica ('EIA Guidelines') updated by the ATCM in 2005¹⁴⁶ "fill [some of] the gaps"¹⁴⁷ with NNS explicitly mentioned in the document but only outlines the process under which NNS should be considered.¹⁴⁸ The EIA Guidelines are attached to a non-binding resolution and their informal nature is reinforced by the Resolution's wording that recognises the primacy of pre-existing national legislation and other obligations of AT Parties.¹⁴⁹ However, the CEP specifically provides for discussion on the consistency of the CEP with the Guidelines.¹⁵⁰ Discussion in the CEP and state practice in preparing CEE's suggests many of the provisions in the Guidelines, including considering NNS impacts, are considered essential.¹⁵¹ However, many of the biosecurity threats posed by scientific activity are ongoing and based on the cumulative exposure of the environment to risk.¹⁵² The lack of a strategic approach to planning activity in order to assess and address threats to the environment is a significant restriction in the regime's stated purpose.¹⁵³ Moreover, the provision for transparent discussion at the CEP and ATCM is a limited method of ensuring compliance.¹⁵⁴

¹⁴⁵ W M Bush, 'Means and Methods of Implementation of Antarctic Environmental Regimes and National Environmental Instruments: An Exercise', in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000), 30.

¹⁴⁶ ATCM, Revised Environmental Impact Guidelines, ATCM XXVIII Recommendation 4.

¹⁴⁷ Bush, above n 145, 31

¹⁴⁸ For example, in the analysis of impacts, "identifying introduced species" is considered; EIA Guidelines, 3.3.1.

¹⁴⁹ A D Hemmings and L K Kriwoken, 'High Level Environmental Impact Assessment under the Madrid Protocol: state practice and the effectiveness of the Comprehensive Environmental Evaluation process' (2010) *International Environmental Agreements: Politics, Law and Economics* (published online Springerlink 10 February 2010, 10.1007/s10784-010-9119-5), 5.

¹⁵⁰ CEP, Procedures for intersessional CEP consideration of draft CEEs, CEP X Appendix 1 (2006).

¹⁵¹ For example: CEP, *Report to CEP X* [47-48], (India clarifying what it is going to about NNS). The impact matrix does not identify NNS as an issue, although does discuss potential wastewater introduction of "bacteria". Other elements of the CEE do mention NNS and mitigation measures. India, *Draft CEE of New Indian Research Base at Larsemann Hills, Antarctica*, ATCM XXX IP 7(2006) (65); CEP, *Report to CEP XI* [69], "the final CEE should provide more details about planned waste management measures."

¹⁵² J Whinam, N Chilcott and D M Berstrom, 'Subantarctic hitchhikers: expeditioners as vectors for the introduction of alien organisms' (2005) 121 *Biological Conservation* 207, 215.

¹⁵³ Hemmings and Kriwoken, above n 149, 17.

¹⁵⁴ *Ibid*, 10.

2.2.1.1.1. A MORE THAN MINOR OR TRANSITORY PROBLEM: INADEQUATE SCOPE

Biosecurity risks are by their nature imprecise.¹⁵⁵ The uncertainty as to biological baselines is compounded with uncertainty over specific species invasiveness and the impacts on biological diversity, highlighting the importance of precaution in the approach to NNS risks.¹⁵⁶ Given any activity involves the introduction of NNS into Antarctica; a strict precautionary approach to environmental impacts could prohibit all activity. This is undesirable and inconsistent with the freedom of science and peaceful activity underpinning the ATS. Ideally, a planning process should expressly identify the risks associated with NNS and determine what level of risk is acceptable in regard to the various aspects of activities that constitute a biosecurity threat. The EIA process does not do this, instead providing for a preliminary assessment to determine whether an activity will cause a minor or transitory impact¹⁵⁷ and if so, a initial environmental evaluation (IEE) to evaluate whether it will cause more than a minor or transitory impact, which invokes a comprehensive environmental evaluation (CEE). There is no elaboration on what a “minor or transitory impact” is, other than the environmental consequences that must be avoided.¹⁵⁸ A number of WPs offer guidance¹⁵⁹ but the EIA Guidelines expressly provides for interpretation on a case by case basis.¹⁶⁰ The EIA Guidelines instead invoke NNS as an “output” of activity indicating it will impact flora and fauna.¹⁶¹ The plain language interpretation implies the introduction of a transient NNS might not require any analysis or mitigation beyond a preliminary assessment of the risk. This is reflected in the United Kingdom’s CEE for Halley Research Station, identifying two levels of risk for persistent and transient NNS.¹⁶² By leaving the definition up to interpretation, the ATS expressly provides for inconsistent implementation which has led to the significant differences in the levels of EIA carried out by AT Parties.¹⁶³

¹⁵⁵ Shine, above n 4, 81.

¹⁵⁶ M Clout and M De Poorter, ‘Invasive Alien Species: Global Lessons and Antarctic Implications,’ in M Rogan-Finnemore (ed), *Non-Native Species in the Antarctic Proceedings* (2008), 35.

¹⁵⁷ PEPAT, Article 8(1)

¹⁵⁸ See above; PEPAT, Article 3(2)(b); Bastmeijer, above 69, 194-5.

¹⁵⁹ See for example: Australia, Environmental Impact Assessment – the Role of EIA Guidelines in Understanding “Minor” or “Transitory” ATCM XXII WP 19 (1999); Argentina, Procedures of Environmental Assessment (Annex I of the Madrid Protocol) ATCM XXII WP 14 (1999).

¹⁶⁰ EIA Guidelines, 2.

¹⁶¹ Ibid, 10.

¹⁶² See Table 2; United Kingdom, Proposed Construction and Operation of Halley VI Research Station, and Demolition and Removal of Halley V Research Station, Brunt Ice Shelf Antarctica, ATCM XXX IP 102 (2007).

¹⁶³ Bastmeijer, above n 71, 229-230.

TABLE 2.1: PORTION OF IMPACT MATRIX FROM CEE: *OPERATIONAL ACTIVITIES AT HALLEY VI RELEVANT TO BIOSECURITY CONSIDERATIONS*¹⁶⁴

Activity	Output	Predicted Output	Probability	Extent	Duration	Significance/Severity	Mitigating or Preventative Measure
Shipping and cargo handling at ice edge	Solid and liquid waste, including sewage	Introduction of faecal bacteria	Certain	Area-specific (ship route to Weddell sea)	Short	Very low	All wastes to be managed in accordance with BAS Waste Management Handbook. Most waste stored on-board for discharge at Port Reception Facilities Food waste macerated before discharged to sea or incinerated Sewage treated aboard supply vessel and effluent discharged at sea.
	Ballast water discharge	Transfer of Invasive Alien Species	Low	Local	Short (if species dies) Long (if it breeds)	Very low (if no survivors) High (if breeds)	Exchange of ballast water to be undertaken at deep sea locations only BAS Ballast Water Management Plan to be followed.
	Introduction of alien species	Transfer of NNS to Antarctica	Low	Local	Short (if species dies) Long (if it breeds)	Very low (if no survivors) High (if breeds)	All vehicles and equipment to be cleaned before shipping to Antarctica

The extensive provision for consideration of cumulative impacts¹⁶⁵ in the EIA Guidelines¹⁶⁶ should provide for an examination of whether the exposure of transient NNS might potentially result in a more persistent introduction. However, without a strategic consideration of impacts across activities and actors, the cumulative threats cannot be adequately quantified.¹⁶⁷ The impact matrix provided by the United Kingdom for the Halley VI station is an example.¹⁶⁸ Although the immediate risks associated with the change in activity are evaluated, the ongoing risks posed by the exposure of waste, expeditioners and supplies to the Antarctic environment are not considered. Designing the station to ensure these aspects are minimised or taking into account the potential impact of other human activity in the area is not contemplated in the EIA. Plans and programs do not fall under the scope of the EIA provisions of PEPAT, although some states have implemented programmatic EIA for their individual programs.¹⁶⁹ ASOC and a number of authors have proposed a move to strategic

¹⁶⁴ Adapted from United Kingdom, above n 160, 63 (provisions relevant to NNS) [emphasis added].

¹⁶⁵ Defined as “the combined impact of past, present and reasonably foreseeable activities.” EIA Guidelines, 11.

¹⁶⁶ EIA Guidelines, 1, 3, 6, 7, 9, 11, 12, 16, 18, 21.

¹⁶⁷ Hemmings and Roura, above n 140, 21.

¹⁶⁸ See Table 2.1.

¹⁶⁹ Bastmeijer, above n 71, 201.

environmental assessment or area based planning processes,¹⁷⁰ “abandoning the national-based or project based...[EIAs] and moving towards joint EIAs covering large geographical areas, including all actors involved in that area.”¹⁷¹ Such a possibility will be discussed in more detail in Chapter 5.

2.2.1.1.2 LIMITS IN THE PROCESS: APPLICATION AND CONSIDERATION

At each stage of the EIA process, the procedure for analysis is elaborated more extensively in the text of Annex I.¹⁷² The minimum requirements of the analysis must fulfil the requirements of Article 3(2)(c) of PEPAT but otherwise the PA is left to entirely appropriate national procedures without need to produce a formal document or account in any way for the decision making process.¹⁷³ Consistent consideration of biosecurity risks across programs is essential. However, as well as the threshold for further analysis, the process permits inconsistent application. The practical effect of subjective application is a lack of uniform application. States that put a high priority on environmental protection may conscientiously engage in the more prescriptive CEE processes¹⁷⁴ but if for any reason, a State wishes to bypass the more stringent elements of the test, it may classify its action as an IEE or engage in a substandard analysis.¹⁷⁵ Hemmings and Roura commented on both the general high quality, but low quantity of CEEs and great variability of IEEs, some close to CEE in comprehensiveness and some “simply atrocious”.¹⁷⁶ While some states have been proactive, there is a real risk that under some jurisdictions the lack of mandatory and universal consideration of similar issues will make the EIA process nothing more than a rubber stamp required for Antarctic activity.¹⁷⁷ The EIA process is the only way to ensure national parties are taking adequate measures to prevent the invasion of NNS before engagement in activity. It is essential the EIA is comprehensive and applied consistently in the decision making process.

¹⁷⁰ Hemmings and Roura, above n 140, 19; Bastmeijer, above n 69, 458-461; ASOC, Strategic Needs and Decision Making in Antarctica SATCM XII IP 10 (2000), ASOC, Antarctic Strategic Environmental Assessment: Application to the Growing Antarctic Tourism Industry ATCM XXIV IP 54, Y Kakabadse, ‘The Antarctic Protected Areas System: Challenges and Practise’, in J Valencia (ed.) Report of the Second Antarctic Protected Areas Workshop held in Lima, Peru 22-23 May 1999 (2000), 11.

¹⁷¹ Kakabadse, *ibid.*

¹⁷² See Table 2.

¹⁷³ Hemmings and Roura, above n 140, 15.

¹⁷⁴ See Table 2.

¹⁷⁵ Hemmings and Kriwoken, above n 149, 2.

¹⁷⁶ Hemmings and Roura, above n 140, 20; *Ibid.*, 9-10.

¹⁷⁷ Some jurisdictions appear to have no legal capacity to modify, restrict or otherwise impose any conditions upon the operator, so long as they have completed the paper trail.” Hemmings and Kriwoken, above n 147, 5.

TABLE 2.2: COMPARISON OF THE REQUIREMENTS OF THE VARIOUS ASPECTS OF THE PEPAT EIA PROCESS

	Article 3(2)(c)	PA	IEE	CEE
Threshold	All activities.	Less than minor or transitory impact.	A minor or transitory impact on PA.	More than a minor or transitory impact on PA or IEE.
Components	Area, duration, intensity. Cumulative impacts. Mitigation. Monitoring. Response.	Environmental impacts.	Purpose, location, duration, intensity. Alternatives. Impacts. Cumulative impacts.	IEE Components. Baseline environment. Methods to determine impacts. Indirect impacts. Mitigation. Uncertainty.
Consideration	Informed judgments must take into account components.	May proceed.	May proceed with appropriate processes to verify impact.	May proceed after consultation with other Parties, consideration at CEP. Decision to proceed based on CEE.

Moreover, there is no requirement for a State to stop an activity on conclusion of an EIA. Although a State must take into account the possibility of not proceeding, even if a CEE indicates a high risk of NNS introduction, a State may choose to proceed.¹⁷⁸ The EIA process puts the proponent of an activity in charge of interpreting the threshold for more advanced analysis, engaging in the analysis and deciding whether that analysis will influence a decision to proceed. With the unique and challenging conditions of Antarctic logistics, it is unlikely after the process is completed, a party will ever choose not to proceed.¹⁷⁹ However, as with many elements of the ATS, the influence of informal diplomatic pressure and public awareness will play a role in decreasing the risk of any significant invasion being permitted.¹⁸⁰ The international engagement with CEEs has certainly had a positive impact.¹⁸¹ Public scrutiny through the CEP and ATCM play a role in making the decision making process transparent and allowing for better understanding of the impacts.¹⁸² However, despite many AT Parties having concerns about certain activities, they have still gone ahead, which is

¹⁷⁸ PEPAT, Annex I, Article 3, 2(a); e.g. the Draft CEE on the Czech Republic station met with sustained scepticism about certain proposed environmental impacts, without an adequate reply, but the station construction still went ahead, *Report of CEP VII* (2004), [57-71].

¹⁷⁹ Hemmings and Roura, above n 140, 5.

¹⁸⁰ F O Vicuña, 'The effectiveness of the Protocol on Environmental Protection to the Antarctic Treaty' in O S Stoke and D Vidas (eds.) *Governing the Antarctic* (1996), 190.

¹⁸¹ Hemmings and Kriwoken, above n 147, 10.

¹⁸² PEPAT, Annex 1, Article 3(3)-(6); one of the functions of the CEP is to provide advice on "the application and implementation of the EIA procedures set out in Article 8 and Annex 1": PEPAT, Article 12(1)(d).

a significant limitation in the systems effectiveness.¹⁸³ The effectiveness and limitations of the system in regards to biosecurity threats are illustrated by the controversy over the drilling of Lake Vostok by the Russian Federation.¹⁸⁴ The sub-glacial lake is highly valued by scientists for its pristine quality.¹⁸⁵ The CEE for the scientific drilling effort indicated considerable bacterial diversity in the Vostok borehole drilling fluid and the potential for the introduction of transient NNS into the lake water.¹⁸⁶ The consultation resulted in considerable criticism over the contents of the CEE, particularly in its assessment of the methods of drilling and the potential worst case contamination of the environment.¹⁸⁷ Although Russia suspended penetration, it continued drilling to build baseline information and indicated that despite the criticism, it had met the requirements of PEPAT and intended to proceed.¹⁸⁸ Since then, alternative strategies have been designed by the scientific community¹⁸⁹ and Russia has developed a clean mechanism to intrude into the area.¹⁹⁰ However, it still has not addressed some of the issues posed in the discussion and arguably faces almost universal opposition to its approach.¹⁹¹

2.2.1.1.3 SUMMARY

Although proving difficult to universally implement, the EIA is one of the few front line environmental tools that most States had some awareness of in the negotiation of PEPAT.¹⁹² The compromise between political expediency and environmental protection has resulted in a reasonably robust system that requires States to analyse the impact proposed activities will have on the environment and where the impact is more than minor or transitory, consult with other nations over potential mitigation measures. It does not, however provide a mechanism for Parties to

¹⁸³ Hemmings and Kriwoken, above n 147, 10.

¹⁸⁴ Russian Federation, Water Sampling of the Subglacial Lake Vostok: Draft Comprehensive Environmental Evaluation (revised) ATCM XXVI WP 01 (2003); Russian Federation, Drilling of an Additional 75 m in deep Borehole 5G-1 at Vostok Station IEE ATCM XXIX IP 68 (2006); CEP, Report of CEP IV (2001) [26-27].

¹⁸⁵ SCAR, Exploring Subglacial Antarctic Lakes: A SCAR Report on Progress ATCM XXV IP 55 (2002), 1.

¹⁸⁶ Russian Federation, Water Sampling of the Subglacial Lake Vostok: Draft Comprehensive Environmental Evaluation (revised) WP 01/XXVI ATCM (2003), 26-27.

¹⁸⁷ CEP, Report of CEP V (2002) [15-19]; CEP, CEP Advise to ATCM XXVI on the Draft CEE Contained in ATCM XXVI/WP01, Report of CEP VI (2003), [19-27]; Report of CEP IX [40-46].

¹⁸⁸ CEP, *Report of CEP VI* (2003) [27].

¹⁸⁹ SCAR, above n 185, [the Chair noting its importance in regards to NNS].

¹⁹⁰ Russian Federation, Results of Russian studies of the subglacial Lake Vostok during the season 2007-2008, ATCM XXXI IP 44 (2008) [154].

¹⁹¹ See for example: the potential hydrostatic pressures and leaving drill fluid in deep-ice holes after completion. In fact, the abandonment of a broken drill further indicates Comments of New Zealand in the *Report of CEP VI* (2003), [26]; Hemmings and Kriwoken, above n 147, 16.

¹⁹² Hemmings and Roura, above n 140, 14.

collectively and strategically plan their activities in order to minimise environmental impacts which limits its utility for a biosecurity framework. Potential developments for the regime will be proposed in Chapter 5.

2.2.1.2. BIOSECURITY PERMITS TO CONSERVE NATIVE FLORA AND FAUNA

Annex II of PEPAT requires AT Parties to institute a permit based system to regulate the introduction of NNS.¹⁹³ The primary focus is the regulation of intentional introductions, although the Annex introduces a duty to take preventative measures to exclude non-native microorganisms.¹⁹⁴ The Annex was amended in 2009, concluding 6 years of debate in the CEP and ICG.¹⁹⁵ The structure of the section is altered to better elaborate ambiguous provisions in the original and the scope of the section is expanded to include all NNS, rather than only Antarctic flora and fauna.¹⁹⁶ However, despite considerable attention drawn to the issue of NNS, no further elaboration of biosecurity was undertaken.

2.2.1.2.1. ATTACHING A SHORT LEASH: REGULATING INTENTIONAL INTRODUCTIONS

The permit is a “formal permission in writing issued by an appropriate authority.”¹⁹⁷ Article 13 of the Protocol¹⁹⁸ and Article 4 of Annex 1¹⁹⁹ impliedly require the EIA process to make reference to the permit system, and the permit effectively supplements the EIA to require additional planning processes when planning to interact with special areas or Antarctic flora and fauna.²⁰⁰ The operation of the permit is dependent on national procedures but usually either prohibits or limits conduct unless one has possession of a document that has required analysis and rationalisation of the conduct. The essential reliance on the proponents of activity and lack of a transparent consultation process invokes similar concerns as the EIA process.

¹⁹³ PEPAT, Annex II, Article 4.

¹⁹⁴ Mansfield and Gilbert, above n 7, 140.

¹⁹⁵ ATCM, Amendment of Annex II to the Environmental Protocol, ATCM XXXII Measure 16 (2009).

¹⁹⁶ Australia, ‘Annex II: Finalising the Review’, WP 39/ATCM XXII; Appendix B: Annotated summary of changes to Annex II, 11.

¹⁹⁷ PEPAT, Annex II, Article 1(f); Annex V, Article 1(b).

¹⁹⁸ Requiring Parties to take “appropriate measures within its competence” to ensure compliance with the protocol, Protocol, Article 13(1)

¹⁹⁹ Decision makers must be informed by the EIA of “as well as other relevant considerations.”

²⁰⁰ K Bastmeijer and R Roura, ‘Environmental Impact Assessment in Antarctica’, in K Bastmeijer and Koivurova T (eds.) *Theory and Practise of Transboundary Environmental Impact Assessment* (2008), c.f. Article 8 and Annex I do not make explicit mention of permits; Bush, above n 143, 34.

The precautionary requirement for strictly regulated permits when introducing reflects an acknowledgment of the potential damage of NNS.²⁰¹ Article 4 of Annex II prohibits the introduction of NNS or non-sterile soil without a permit and only permits introduction for controlled use in the case of hydroponics or controlled experimental use with a rationale justifying the introduction.²⁰² The NNS must be removed²⁰³ or disposed of by the end of the permit and precautions must be taken to prevent escape or contact with native flora or fauna.²⁰⁴ An exception is provided for food, as long as animal products are kept under carefully controlled conditions and disposed of in accordance with Annex III to the Protocol.²⁰⁵ In addition, avian products must be treated to ensure poultry or avian produces are free from contamination.²⁰⁶ Inspection reports indicate some AT Parties also permit pot plants for aesthetic purposes, although inspectors have concluded this might constitute a breach of PEPAT.²⁰⁷ The lack of any practical way to discern whether the introduction of pot plants is in conflict with PEPAT or enforce compliance, short of the dispute resolution process, is a significant limitation in the ATS.

The Annex also provides for direct response to NNS introduction but without any guidance or framework to implement an effective response system. Annex II provides that when an unpermitted NNS is introduced, it must be “removed or disposed” of “whenever feasible”, unless the response measure would “result in a greater adverse environmental impact”.²⁰⁸ The importance of taking a precautionary approach to response is demonstrated in the sub-Antarctic, where devastating ecosystem-wide impacts have been inflicted through an eradication of an NNS.²⁰⁹ In addition, the approach does not identify any harmful attribute of the NNS, requiring response wherever an introduction is identified. Arguably, this provision applies as much to unintentional introductions as intentional introductions. There is nothing to preclude its application, although the context of the Annex without any elaboration entails it is only likely to be implemented in relation to intentional introductions. The conditions are an entirely appropriate precaution for responding to an introduction, establishment or invasion.

²⁰¹ Mansfield and Gilbert, above n 7, 154-155.

²⁰² PEPAT, Annex II, Article 4(3).

²⁰³ PEPAT, Annex II, Article 4(4).

²⁰⁴ PEPAT, Annex II, Article 4(3)(b).

²⁰⁵ PEPAT, Annex II, Article 4(6).

²⁰⁶ PEPAT, Annex II, Article 4(8).

²⁰⁷ See Appendix 4, ‘Biosecurity Content of Inspection Reports since PEPAT came into force’ and Section X below.

²⁰⁸ “The removal or disposal may include by incineration or by equally effective means, so as to be rendered sterile, unless it is determined that they pose no risk to native flora or fauna.” Annex II, Article 4(5) .

²⁰⁹ See for example: the impacts of eradicating cats on Macquarie Island, Chapter 1.5; D Berstorm, *et al*, ‘Indirect effects of invasive species removal devastate World Heritage Island,’ (2009) 46 *Journal of Applied Ecology* 79-80.

However, the permit system does not adequately provide the potential cumulative impacts of intentional NNS introduction. The information sharing provisions of the Annex are not ideal in a biosecurity context. If a scientific body applies for a permit to introduce a NNS,²¹⁰ Annex II only requires the information to be passed to other States at the end of the season.²¹¹ This does not allow the appropriate State body to make an informed judgment with knowledge of the quantity and quality of other activities in the area.²¹² In addition, the Annex expressly excludes the intentional translocation between Antarctic sites.²¹³ Restricting the definition of NNS to intercontinental introductions fails to account for the significant genetic variation within Antarctic communities and the significant difference between geophysical regions in the Antarctic.²¹⁴ The threats posed by other Antarctic NNS may in fact be more significant than alien NNS, as they are more likely to be adapted to the climate of the subject area.²¹⁵

2.2.1.2.3 INADEQUATE DEFINITIONS: REGULATING UNINTENTIONAL INTRODUCTIONS

The only express mention of unintentional introductions is made in relation to microorganisms. Precautions must be taken to prevent the accidental introduction of non-sterile soil and microorganisms not present naturally in the ATA.²¹⁶ Given little is known about the impacts of human microbes on the Antarctic environment,²¹⁷ this is an appropriate precaution. In addition, the response measures mentioned above seem to contemplate NNS introduced intentionally or unintentionally. However, the lack of a more general obligation to take broad measures to prevent the unintentional introduction of NNS into the Antarctic environment is a significant gap in the ATS and leaves AT Parties without a firm rationale to implementing a biosecurity framework. The instrument does not expressly exclude unintentional introductions and some states refer to Article 4 of Annex II as the rationale for their biosecurity policy.²¹⁸ However, excluding all possible introductions without a permit is not a suitable basis for a biosecurity framework as almost all activity and aspects of activity pose a risk of introduction and would consequently be

²¹⁰ Bush, above n 143, 36.

²¹¹ Annex II, Article 6.

²¹² Bush, above n 143, 36.

²¹³ Annex II, Article 4(1), "...no species of living organisms not native to the ATA...".

²¹⁴ P Convey, 'Non-native species in Antarctic Terrestrial and Freshwater Environments: Presence, Sources, Impacts and Predictions,' in M Rogan-Finnemore (ed.), *Non-Native Species in the Antarctic Proceedings* (2008) 111-114.

²¹⁵ *Ibid*, 114.

²¹⁶ Annex II, Article 7, 9.

²¹⁷ Convey, above n 214, 108-111.

²¹⁸ For example: Antarctica New Zealand, *Biosecurity and Non-native species*, Health, Safety and Environment Policy – 7 (2009), 2.

administratively unworkable. A more strategic, area based management process is more appropriate.

Since PEPAT came into effect, CEP has identified NNS as a significant issue.²¹⁹ Initially focussed on the impact of disease, the “introduction of NNS” has grown in prominence and is now top priority on the five year plan of the CEP.²²⁰ The approach of the CEP to NNS has been divided into two phases. The early discussions focussed on wildlife disease. An Intersessional Contact Group (‘ICG’) set up by the CEP broadly addressed the issue, assessing the risks²²¹ and then providing a draft report on practical measures to diminish risk.²²² The report includes recommendations for an awareness program, prioritising research, exchanging information, quarantine measures for equipment and waste and coordinated response measures. However, noting the low risk identified in the report, the CEP did not forward the measures to the ATCM for adoption and only Australia has made reference to the measures recommended in consequent information papers describing national biosecurity processes.²²³ Since then, the Parties have addressed generic NNS issues in a more disparate manner. Several countries have provided guidance on specific tools; others describe their own programs approach to minimising risks. The table on the following page analyses the submissions:

²¹⁹ Initially in relation to the introduction of disease to Antarctic wildlife ; *Report of CEP 1*, [34] ; see Australia, France and New Zealand, above n 1.

²²⁰ See Figure X; *Report to CEP XI* (2009), 457; see Section 2.2.2 below for more information.

²²¹ Australia, Report on the open-ended [ICG] on Diseases of Antarctic Wildlife: Review and Risk Assessment ATCM XXIV WP 11 (2001).

²²² Australia, Report on the open-ended ICG on Diseases of Antarctic Wildlife: Practical Measures to Diminish Risk (Draft), ATCM XXIV WP 11 (2001).

²²³ Australia, Draft Response Plan in the Event that Unusual Animal Deaths are Discovered, ATCM XXV IP 62 (2002).

TABLE 2.3: BIOSECURITY GUIDANCE PROVIDED BY CEP UNDER PEPAT, ANNEX II²²⁴

Tool	Annex II/CEP Submission ²²⁵	Description and Comment
Risk Analysis	Annex II(1): Permits to introduce NNS. New Zealand (IP 36/CEP X; IP 36/CEP XII): A framework for analysing and managing NNS risks in Antarctica.	PEPAT requirement to analyse the risks of any intentional introduction but no obligation to analyse the biosecurity risks involved with ongoing activities. New Zealand framework provides useful breakdown of risks for a scientific station supplied by ship and air. ²²⁶
Knowledge Base	New Zealand (IP 37/CEP X), Australia (WP 16/CEP XI): Antarctic Alien Species Database. Australia and SCAR (IP 49/CEP X): Alien's in Antarctica. Uruguay [Spanish] (IP 33/CEP XI), Measures to Prevent the Introduction of Alien Species in Antarctica, in support of Annex II of the Protocol. ²²⁷	With capacity to search by species, geographical region or alien status, Antarctic Alien Species database provides an easily accessible way to identify and keep record of any alien organism. Uruguay proposes the retention of physical specimens of any NNS for genetic analysis. Results from Alien's in Antarctica, an international series of studies focussed on NNS in Antarctica, should guide management action and inform future research. The work program encourages input of NNS into the Biodiversity database.
Understanding and Awareness	United States (IP 93 rev. 1/CEP XI): "Don't Pack a Pest When Travelling to Antarctica." Australia (IP 44/CEP VII): Australia's Antarctic Quarantine Practises. Uruguay Quarantine practises	United States, Uruguay and Australian compulsory briefing for all personnel, aimed at minimising the spread of propagules attached to personal belongings. Australia and United States include informing suppliers that goods must not include NNS, with the limited exceptions under Annex II.
Quarantine and Border Control	Annex II (6,7,8,9): Precautions to avoid microorganisms and non sterile soil. Australian and Uruguayan Quarantine practises South Africa (WP 23/CEP XII); mitigating NNS associated with transport.	Inspections and treatment of vessels and cargo, dedicated cargo facilities, dedicated clothing kept in the Antarctic, and reporting processes for breaches are included in useful description of national quarantine processes (Uruguay and Australia) and future recommendations (South Africa). Quarantine manual in development. ²²⁸
Control of High-Risk Goods	Annex II (2,6,9): No dogs, non-sterile soil, living birds; (6, 8): manage animal and plant food, especially poultry. Australian and Uruguayan Quarantine practises Annex III: Disposal of high-risk goods.	Prohibition of certain high-risk goods useful but no guidance on how to identify high-risk goods, other than listed in Annex II. Both Australian and Uruguayan engage in treatment regimes, in addition the Australian program requires biosecurity measures of its suppliers. Dedicated discussion of high risk environment/areas/activities/species at CEP XIII (2000) ²²⁹
Quarantine Between Antarctic Sites	Australian and Uruguayan Quarantine practises SCAR (IP 4/CEP XII), Environmental code of conduct for terrestrial scientific field research in Antarctica United Kingdom (IP 36/CEP XII); NNS associated with transport. United States (IP 110/CEP XI), Sub glacial Environments: Environmental and Scientific Stewardship	Nothing directly applicable but useful descriptions of national procedures, including cleaning, inspection and reporting processes. United Kingdom and SCAR provide best practise guidelines advising full cleaning of equipment before and between sites, care with waste materials, selectivity with materials taken onto the field and inspection processes. Suggested mitigation measures to deal with microbial species introduced into sub-glacial environments through drilling; focus on future research.

²²⁴ Submissions relevant to Tourism, Marine Quarantine, Area Protection, Surveillance and Response, discussed at appropriate sections below. For more information and rationale on appropriate tools, see IUCN Biosecurity Guidelines.

²²⁵ Details of submissions included in Appendix 1: Summary of Submissions to CEP and NNS.

²²⁶ Discussed further in Chapter 5.

²²⁷ Uruguay, Medidas Previas para evitar la introduccion de especies alienas en la Antartida, en cumplimiento del Anexo II del Protocolo, ATCM XXXI IP 33 (2008) ('Uruguay Quarantine practises').

²²⁸ Australia, France and New Zealand, above n 1, adopted to 5 year work program by CEP XII; *Report to CEP XII* (2009) [193].

²²⁹ Australia, France and New Zealand, above n 1, 3; adopted to work program by CEP, *Report to CEP XII* [193].

A cohesive structure for recommendations and an overarching purpose is recommended in the *Report of the 2006 Workshop on Non-Native Species*²³⁰ and reaffirmed in a biosecurity work programme established for the CEP by Australia, France and New Zealand.²³¹ As indicated in Table 2, SCAR has attempted to consolidate the recommendations relevant to field research into a Code of Conduct.²³² However, the formation of a new ICG on biosecurity with terms of reference including the setting of key objectives and guiding principles sets the foundation for a strategic biosecurity framework, which will be discussed in Chapter 5.

2.2.1.2.4 SUMMARY

Annex II directly provides for a precautionary approach to the intentional introduction of NNS but stops short of a duty to take measures to prevent the unintentional introduction of NNS. The regulatory system has its limitations that reflect the greater issue of overall fragmented planning processes in the ATS. In particular, the information sharing provisions do not adequately provide for the consideration of potential cumulative impacts and the instrument does not provide for introductions between Antarctic sites. In addition, the CEP and SCAR offer methods of implementing the implicit requirement to consider the risks of NNS in planning activities, although only do so with relatively unstructured guidance.

2.2.1.3 LINES IN THE SNOW: PROTECTING AREAS FROM NNS

The lack of political barriers but variety of indigenous populations in Antarctica means managing biosecurity risk requires separate geographical areas being collectively accorded special protection.²³³ The distinct lack of mandated strategic planning processes or comprehensive biosecurity measures compounds the potential biosecurity threats of a number of states operating in the same areas and governing their own activities. The permit system set up by Annex V of PEPAT mitigates the problem by allowing AT Parties to limit access and conditional entrance on certain geographic areas. Protecting areas is one of the oldest international environmental mechanisms of protection²³⁴ and are a key component for any biosecurity regime, providing regularly monitored

²³⁰ New Zealand, "NNS in the Antarctic": Report of a Workshop ATCM XXIX WP 13 (2006).

²³¹ Australia, France and New Zealand, above n 1, 3; Ibid; New Zealand, "NNS in the Antarctic" A Workshop, ATCM XXIX IP 46 (2006).

²³² SCAR, *SCAR's Environmental Code of Conduct for Terrestrial Field Research in Antarctica* ATCM XXXII IP 04 (2009).

²³³ Shine, above n 4, 31.

²³⁴ A Gillespie, *Protected Areas and International Law* (2007), 10.

and pristine control areas and more stringent biosecurity measures where a particular area has a greater risk of NNS introduction because of cumulative impacts.²³⁵ In the context of a biosecurity framework, it is important that protected areas cover representative biological communities across the Antarctic area in the terrestrial and marine environment, and implement effective, consistent biosecurity measures to ensure the biological integrity of the areas.²³⁶ Strategic protection is necessary to effectively exclude biosecurity threats given the considerable diversity within the Antarctic area and the considerable movement between habitats and niches.²³⁷ Given the considerable proliferation of standards at an international level,²³⁸ it is also important the biosecurity measures are sufficiently comprehensive for consistent implementation across domestic frameworks.

2.2.1.3.1 IDENTIFYING AREAS BEFORE THE ALIENS INVADE

For a protected area system to be relevant to biosecurity, the process for identifying an area should identify variables that correlate positively with biosecurity threats. Both areas subjected to regular NNS exposure and pristine areas with vulnerable indigenous biological communities require specific biosecurity provision. Annex V of PEPAT provides for both areas of risk with two forms of area protection: Antarctic Specially Protected Areas (ASPA) and Antarctic Specially Managed Areas (ASMA). The ASPA provides the opportunity to establish representative control areas and protection to areas sensitive to invasion. The designation is in order “to protect outstanding environmental, scientific, historic, aesthetic or wilderness values, any combination of those values, or ongoing or planned scientific research.”²³⁹ Areas relevant to NNS can include; representative examples of major terrestrial ecosystems and marine ecosystems²⁴⁰; areas with important or unusual assemblages of species, including major colonies of breeding native birds or mammals;²⁴¹ or the type locality or only

²³⁵ Shine above n 2, 51; R J Hall and C A Langham, ‘The U.S. National Amphibian Research and Monitoring Initiative and the Role of Protected Areas,’ (2001) 18 *The George Wright Forum* 2, 15.

²³⁶ ASOC, *Designation of Marine Protected Areas within the Antarctic Treaty Area* ATCM XXXI IP 119 (2008); ASOC, *Marine Protected Areas in the Antarctic* ATCM XXXII IP 41 (2009), 3.

²³⁷ Convey, above n 214, 111.

²³⁸ A Gillespie, ‘Defining Internationally Protected Areas’ (2009) 12 *Journal of International Wildlife Law and Policy* 229.

²³⁹ PEPAT, Annex V, Article 3 (1).

²⁴⁰ *Ibid*, Article 3(2)(b).

²⁴¹ *Ibid*, Article 3(2)(c).

known habitat of any species.²⁴² Guidelines adopted by the ATCM to establish ASPA areas implicitly identify areas that are ecologically sensitive to invasion.²⁴³

Moreover, ASPA's must be identified according to a "systematic environmental-geographical framework"²⁴⁴ which could provide for the strategic limitation of NNS risks. As each species is indigenous to an ecosystem, managing areas allows planning processes to incorporate inter-area transfer of species, as well as applying additional biosecurity protection to biologically sensitive areas. The CEP interpreted this concept based on an environmental domains analysis.²⁴⁵ The framework involves the classification of environmental and geological characteristics into 21 distinct geographical regions, based on the most readily available climate, slope, land cover and geological data.²⁴⁶ The contemplated application of the framework includes "assessing risks from [NNS]."²⁴⁷ The domains analysis allows the Parties, CEP and SCAR to identify those habitats and environments which are the most fragile and representative and apply strict precautionary biosecurity measures to those areas, including limiting access.²⁴⁸

Also useful in a biosecurity framework, the ASMA regulates "areas where activities pose risks of mutual interference or cumulative environmental impacts..."²⁴⁹ The purpose of the ASMA is to create a fluid tool to be used in areas of less importance but more frequent visitation, so cumulative environmental impacts and risks, including those arising from increased exposure to NNS can be better managed.²⁵⁰ The tool has been utilised to identify an area of particular NNS risk in the Larseman Hills and propose potential mitigation measures.²⁵¹ Routes between stations and areas of

²⁴² Ibid, Article 3(2).

²⁴³ Values assisting in the assessment of whether areas fit the provisions of Annex V include: "Environmental values: does the area contain...biological features e.g. ...plant life or animal life that are particularly unique or representative components of the Antarctic environment?;...Wilderness values: does the area contain characteristics e.g....untravelling or infrequently visited terrain that are particularly unique or representative components of the Antarctic environment?" ATCM, *Guidelines for Implementation of the Framework for Protected Areas*, ATCM SXII Resolution 1 (2001), [2.1] ('Guidelines for Implementing Protected Area Framework').

²⁴⁴ PEPAT, Annex V, Article 3(2).

²⁴⁵ ATCM, *Environmental Domains Analysis for the Antarctic continent as a dynamic model for a systematic environmental geographic framework* ATCM XXXI Resolution 3 (2008).

²⁴⁶ New Zealand, *Systematic Environmental Protection in Antarctica : Final Report on Environmental Domains Analysis for the Antarctic continent as a dynamic model for a systematic environmental geographic framework for Annex V of the Protocol* ATCM XXXI (2008), 3.

²⁴⁷ CEP, *Final Report of CEP XI* (2008), 244

²⁴⁸ ATCM, above n 245, 2; ASOC, *Marine Protected Areas in the Antarctic* ATCM XXXII IP 41 (2009), 8.

²⁴⁹ PEPAT, Annex V, Article 4(2).

²⁵⁰ Cohen, above n 11, 554.

²⁵¹ Australia, China, India, Romania and Russian Federation, *Measures to protect Larsemann Hills, East Antarctica, from the introduction of NNS*, ATCM XXIX IP 17 (2008).

first entry between biogeographic zones are potentially subject to higher risks,²⁵² but the development of strategic biogeographic ASPA protection may also assist with the further designation of ASMAs.²⁵³

One significant gap in geographic coverage is the marine environment. Around 15% of Antarctic's ice-free ground is protected but less than 1% of the Antarctic marine environment has any form of protection under Annex V.²⁵⁴ Establishing protected areas in the marine environment has proved difficult, even though scientific and support activity utilises the marine environment extensively and constitute a significant biosecurity threat. At CEP VI, the first entirely marine ASPA's entered into force and since, two other areas have been established.²⁵⁵ There is a reluctance of AT States to make explicit reference to the marine environment, partially as a result of a perceived jurisdictional overlap with CCAMLR.²⁵⁶ CCAMLR must approve any ASPA or ASMA with a marine component where there is actual harvesting or potential for harvesting or the draft management plan might restrict CCAMLR activities.²⁵⁷ One of the major issues with protecting areas in the marine environment is the significant traffic from non-party states; this will be discussed in more detail in relation to CCAMLR's response and the international response to MPAs in Chapter 3.²⁵⁸

2.2.1.3.2 MAINTAINING A CONTAINMENT FIELD: MANAGING PROTECTED AREAS

The relevance of the protected area regime to a biosecurity framework relies on the management process effectively excluding the impacts of NNS. While the ASPA process provides a mechanism to limit access with a permit and binding conditions on permits through a management plan,²⁵⁹ ASMAs expressly exclude limiting access.²⁶⁰ Any Party to the AT, SCAR or CCAMLR may propose an area for protection under Annex V by submitting a draft management plan to the CEP.²⁶¹ However, unlike the non-CEE aspects of the EIA process and Conservation Permits under Annex II which place a considerable onus of consistent implementation on the proponent of activity, protected area

²⁵² Clout and De Poorter, above n 156, 21.

²⁵³ PEPAT, Annex V, Article 4(3).

²⁵⁴ United Kingdom, Review of provisions relating to Non native species introductions in ASPA and ASMA management plans ATCM XXXII WP 33 (2009), 3.

²⁵⁵ ASPA No 152 (Western Bransfield Straits) and 153 (Eastern Dallmann Bay); see CEP, *Report of CEP VI*, [121-122].

²⁵⁶ ASOC, Marine Protected Areas in the Antarctic ATCM XXXII IP 41 (2009), 3.

²⁵⁷ PEPAT, Annex V, Article 6(2); ATCM, *Marine Protected Areas* ATCM XXVIII, Decision 9 (2005).

²⁵⁸ See below, Section 2.4.1, Chapter 3, Section 2.4.1.

²⁵⁹ PEPAT, Annex V, Article 5(3)(i).

²⁶⁰ *Ibid*, Article 4(3).

²⁶¹ *Ibid*, Article 5(1).

management plans are subject to an international adoption process. Management plans must be approved by the ATCM and are then fast tracked into implementation, allowing for AT Parties to collectively implement area protection without waiting for lengthy domestic ratification processes.²⁶² To ensure the management plans remain consistent and address the appropriate issues, the designation includes a consultation process, where AT Parties, SCAR and CCAMLR's comments are considered.²⁶³ Annex V expressly requires consideration of the importation of NNS in the preparation of a management plan.²⁶⁴ No analogous provision exists for the ASMA, but as well as providing "a statement of the aims and objectives of the Management plan", the Annex indirectly provides for biosecurity by requiring all protected areas' management plans to describe access and movement in the area, activities permitted in the area, and the disposal of waste.²⁶⁵ There is clear scope to provide for precautionary biosecurity coverage, by restricting biosensitive waste disposal, restricting entry to that justified for management purposes and providing for decontamination procedures before entering the area. However, the ASMA's capacity to address cumulative risks like NNS is limited by the lack of a legally binding aspect.²⁶⁶

Parties have established guidance that reinforces the necessity to address NNS.²⁶⁷ Although non-binding, the Management Plan Guidelines are referred to in the procedures for the CEP's consideration of management plans.²⁶⁸ However, there has been virtually no discussion of the biosecurity components of management plans in the CEP. Addressing the considerable workload posed by the analysis, the subsidiary group on management plans (SGMP) has been formed to review the proposed guidelines. Although the SGMP has indicated AT Parties should continue to propose specific biosecurity provisions for areas,²⁶⁹ both it and the Biosecurity ICG are working towards guidance on NNS inclusion in management plans.²⁷⁰

²⁶² Ibid, Article 6(1).

²⁶³ Ibid, Article 6(1).

²⁶⁴ The management must provide a "clear description of the conditions under which permits may be granted by the appropriate authority regarding...restrictions on materials and organisms which may be brought into the area." Ibid, Article 5(5).

²⁶⁵ Ibid, Article 5(i),(j).

²⁶⁶ Bastmeijer, above n 71, 301.

²⁶⁷ ATCM, Guide to Preparation of Management Plans for Antarctic Specially Protected Areas, ATCM XII Resolution 2 (1998), 3.10.5.

²⁶⁸ CEP 'Guidelines for CEP Consideration of New and Revised Draft ASPA and ASMA Management Plans' *Final Report of the CEP VI*, Annex 4.

²⁶⁹ CEP, Final Report of CEP XII (2009), [203].

²⁷⁰ Ibid, [193]; Australia, France and New Zealand, above n 1.

The effectiveness of the provision for biosecurity is reflected in 98% of ASPA management plans containing measures minimising the possibility of introducing NNS.²⁷¹ The limitations are illustrated in the quality of the provisions. A small number of ASPAs have developed site-specific biosecurity procedures, providing a useful model for all ASPAs.²⁷² However, only 67% of the management plans have an explicit aim to minimise the possibility of introducing NNS²⁷³ and the restrictions are generally limited to requiring decontamination of footwear and equipment and prohibiting poultry products.²⁷⁴ The proximity of most ASPAs to other ice-free ground introduces additional biosecurity risks; particularly if cleaning footwear, clothing and equipment is advised by a management plan. NNS do not respect territorial boundaries and cleaning outside the boundary could result in unintentional contamination.²⁷⁵ A consistent approach modelled on the SCAR Code of Conduct is more appropriate. In most cases, ASMA management plans also include biosecurity measures, limited to cleaning of scientific between sampling locations and cleaning clothes and equipment.²⁷⁶ The States operating in the Larsemann Hills ASMA have established a 13-point list of generic biosecurity measures applicable to the area, but provide no information on how the measures are to be put into practice.²⁷⁷ In addition, measures to minimise biosecurity risks to the marine environment from bio fouling, ballast water and fishing related issues are completely excluded from the management plans relevant to the marine environment.²⁷⁸

2.2.1.2.3 SUMMARY

The Protected Area system provides a robust consideration of biosecurity issues in the context of high use and pristine areas. AT Parties have been diligent in protecting ecologically sensitive areas and are moving towards an integrated and systematic model of area protection.²⁷⁹ The limitations of many of the practical biosecurity measures found within ASPA management plans is a symptom of the general lack of biosecurity provisions in the Antarctic. Area protection should complement and not supplement a holistic biosecurity framework. In consequence, decontamination procedures

²⁷¹ With the purpose of protecting terrestrial and marine biological values; United Kingdom, above n 254, 5.

²⁷² ASPA 170, 'Marion Nunataks, Charcot Island, Antarctic Peninsula', ASPA 130 Tramway Ridge, Mt. Erebus, Ross Island' and ASPA 118, 'Summit of Mount Melbourne, Victoria Land'.

²⁷³ United Kingdom, above n 254, page 5.

²⁷⁴ Ibid, 5-6.

²⁷⁵ Ibid, 7.

²⁷⁶ Ibid.

²⁷⁷ Australia, above n 250; United Kingdom, above n 253, page 7.

²⁷⁸ This will be discussed in more detail in Section 4.2 below.

²⁷⁹ ASOC, above n 256, 1.

should be universal, rather than limited to ASPAs.²⁸⁰ The role of the protected area regime should be for two purposes that easily fit within the current formulation. ASPA's should exclude any exposure to specific areas by limiting access to management and scientific endeavour that cannot be carried out elsewhere and ASMA's should provide for consistent and comprehensive monitoring and contingency plans for those areas that are subjected to significant human exposure. To some extent, these goals are recognised but a strategic focus on implementing protected areas for the purposes of biosecurity is lacking. In addition, despite the clear provision in the text of Annex V, designating effective marine areas in the marine environment remains problematic.²⁸¹

2.2.1.4. "THERE IS SOMETHING ALIVE IN THERE": MANAGING NNS IN WASTE

A significant vector of alien species is related to waste generated by station and ship operations. Wastes such as food and sewage can contain pathogens and microorganisms and disposal in the Antarctic environment can lead to inadvertent introduction.²⁸² Moreover, NNS travelling on man-made debris may provide opportunities for transfer of terrestrial and marine NNS.²⁸³ Scientific operations and support activities produce a significant proportion of the waste and vessel activity in the Antarctic area.²⁸⁴ Parties either dispose waste within the Antarctic area or remove waste from the Antarctic area but adequately treating the wastes can sufficiently reduce the biosecurity risk.²⁸⁵

PEPAT addresses the management of waste but without a strategic focus on the biosecurity threats posed by the vectors.²⁸⁶ Annex III lays out a comprehensive regime to deal with all waste originating from the terrestrial Antarctic, supported by specific biosecurity measures contained in Annex II.²⁸⁷ The emphasis is on waste storage, disposal and removal from the AT area²⁸⁸ and the reduction of

²⁸⁰ SCAR, above n 232, 1.

²⁸¹ See below, Section 4.2.1 and Chapter 3, Section 2.2.4; L Goldsworthy and A D Hemmings, 'The Antarctic Protected Areas Approach' in S Hart (ed.) *Shared Resources: Issues of Governance*, (2008) IUCN Environmental Law and Policy Paper No.72, 126-7.

²⁸² T Tin *et al*, 'Impacts of local human activities on the Antarctic environment, (2009) 21 *Antarctic Science* 1, Clout and Porter, above n 256, 30.

²⁸³ D K A Barnes and K P P Fraser, 'Rafting by five phyla on man-made flotsam in the Southern Ocean, 262 *Marine Ecology Progress Series* 282.

²⁸⁴ Tin, above n 282, 15; C C Joyner, 'The 1991 Madrid Environmental Protection Protocol: Contributions to marine pollution law,' 2(1996) *Marine Policy*, 20:3, 194.

²⁸⁵ M A Connor, 'Wastewater Treatment in Antarctica' (2008) 44 *Polar Record* 165, 171.

²⁸⁶ Tin, above n 282, 15-17.

²⁸⁷ Joyner, above n 284, 195.

²⁸⁸ PEPAT, Annex III, Article 1.

environmental and other impacts of the waste.²⁸⁹ However, the considerable qualifiers in the text of the Annex make it difficult to hold operators accountable for actions that produce marine pollution.²⁹⁰ Annex IV addresses vessel sourced pollution in the AT area and is specifically linked to the global regulations on the subject.²⁹¹ Reflecting the approach of MARPOL 73/78, the Annex focuses on limiting ship discharges including food wastes and sewage. However, consistent with the customary international law principle, government ships on non-commercial service are exempt from the provisions.²⁹² Although the section introduces a reporting measure to help support compliance, the vast majority of ships supporting science are government owned and through the immunity a considerable scope of biosecurity risk is left unaddressed.²⁹³ Whether the more general provisions of PEPAT apply to vessel sourced pollution divides AT Parties. While United States, Japan, Norway and New Zealand only apply MARPOL and Annex IV, Australia and the United Kingdom adopt a broader interpretation, whereby if a subject is not addressed in the scope of MARPOL or PEPAT addresses the issue expressly, PEPAT as the regional regime, applies.²⁹⁴ Although MARPOL 73/78 is appropriate for addressing the broader scope of activity in the Antarctic marine environment outside AT Parties, prioritising PEPAT allows AT Parties to collectively enact more strict standards on their own activities. The approach of MARPOL 73/78 will be discussed in detail in Chapter 3.²⁹⁵

The practicalities of Antarctic logistics limit a precautionary approach to waste management.²⁹⁶ Treatments that completely exclude the introduction of NNS are limited.²⁹⁷ The removal of all wastes from the Antarctic area could exclude NNS introduction to a certain extent but the practical costs associated with transport are prohibitive.²⁹⁸ Mechanical, biological and physiochemical treatment

²⁸⁹ Ibid, Article 1(2)

²⁹⁰ Joyner, above n 284, 193.

²⁹¹ *International Convention for the Prevention of Pollution from Ships*, opened for signature 2 November 1973 as modified by the 1978 Protocol opened, for signature 26 November 1983 and as regularly amended. 1340 *United Nations Treaty Series* 61 (entered into force 2 October 1983) ('MARPOL 73/78'); PEPAT, Annex IV, Article 14.

²⁹² PEPAT, Annex IV, Article 11(1).

²⁹³ Joyner, above n 284, 192.

²⁹⁴ K R Wood, 'The Uncertain Fate of the Madrid Protocol to the Antarctic Treaty in the Maritime Area' (2003) 34 *Ocean Development and International Law* 141-2.

²⁹⁵ See below Section 3.2.2.3.

²⁹⁶ Vicuña, above n 177, 194.

²⁹⁷ Connor, above n 285, 171.

²⁹⁸ Approximated at Australian \$589,000 for all three Australian stations, as well as health and safety issues, logistical problems and increasing the footprint of the station; Australia, *IEE: Upgrade of organic waste management equipment, procedures and associated infrastructure at Australia's Antarctic stations* (2008) < http://www.ats.aq/documents/EIA/01090enUpgrade%20of%20organic%20waste%20management%20IEE_final2_mt08.pdf > 27.

systems are more cost effective and significantly reduce the risks associated with NNS in waste.²⁹⁹ However, certain wastes must be completely removed from the AT area.³⁰⁰ Annex III specifically provides for removing or destroying waste that poses a biosecurity threat. Any “(a) residues of carcasses of imported animals; (b) laboratory culture of micro-organisms and plant pathogens; and (c) introduced avian products,” must be removed unless “incinerated, autoclaved, or otherwise treated to make sterile.”³⁰¹ Parties must review and attempt to reduce the impacts of ongoing waste sources,³⁰² and also clean up existing waste sites.³⁰³ Annex II also provides for specific waste management measures, particularly providing that any avian product wastes should be removed, disposed of by incineration or “equivalent means that eliminates the risks of introduction of micro-organisms ‘e.g. viruses, bacteria, yeasts, fungi.’”³⁰⁴

However, the Annex also provides for the disposal of biosecurity threats into the environment. Sewage and liquid wastes must be removed “to the maximum extent practicable”³⁰⁵ but may be discharged into the sea or deposited in deep ice pits, where such disposal is the only practicable option.³⁰⁶ The consequence of qualifying such obligations is demonstrated in the 37% of permanent stations and 69% of summer only stations directly exposing the environment to NNS risks.³⁰⁷ Moreover, the required treatment does little to address the biosecurity threat of sewage. In stations occupied by over 30 individuals, waste must be “treated” by maceration.³⁰⁸ Maceration or grinding is designed to reduce the “settleable” content of the waste but has no impact on the pathogens that may be present.³⁰⁹ Moreover, although Annex IV requires ships to disperse³¹⁰ sewage outside 12 nautical miles of land or ice shelves, ships certified to carry less than 10 persons are not restricted by this provision.³¹¹ The potential cumulative impact of smaller ship’s waste disposal is not considered. Most ASPAs provide that sewage should not be disposed of within the protected area but otherwise

²⁹⁹ Ibid, 28.

³⁰⁰ PEPAT, Annex III, Article 2(1)

³⁰¹ Ibid, Article 2(3)

³⁰² Ibid, Article 8(2).

³⁰³ Ibid, Article 8(2)(a).

³⁰⁴ PEPAT, Annex II, Article 4(8).

³⁰⁵ PEPAT, Annex III, Article 2(2)

³⁰⁶ Ibid, Article 4(2).

³⁰⁷ F Gröndahl, J Sidenmark and A Thompson, ‘Survey of waste water disposal practices at Antarctic research stations’ in (2009) 28(2) *Polar Research* 298, 300 [based on a survey of 71 of the 82 research stations in Antarctica].

³⁰⁸ PEPAT, Annex III, Article 5.

³⁰⁹ Connor, above n 285, 166.

³¹⁰ PEPAT, Annex IV, Article 6(b), “...at a moderate rate, and when practicable, where a ship is en route at a speed of no less than 4 knots.”

³¹¹ Ibid, Article 6.

AT Parties either dispose directly into the sea or into “sewage bulbs” in the ice beneath stations.³¹² Some AT Parties, in line with the PEPAT Article 3 principles, adopt a more precautionary approach and either incinerate or treat biological wastes.³¹³ However, allowing the disposal of waste in the environment arguably creates a discrepancy with the reviewed Annex II, Article 4(1) which prohibits intentional introductions without a permit.³¹⁴ Untreated sewage contains non-native microorganisms and without a permit, disposing directly in the Antarctic Environment is indirectly in breach of PEPAT.

While covering a wide scope of waste, the effectiveness of Annex III is compromised in practice as many of the requirements are only operative “to the maximum extent possible” and Annex IV’s sovereign immunity provision practically limits its application to government vessels supporting science. Moreover, the lack of a strategic focus on biosecurity means many AT Parties’ have not assessed the risks of exposing NNS to the Antarctic environment through their waste management practises.³¹⁵ When the CEP comes to review Annex III and as the ICG examines a biosecurity regime,³¹⁶ the systematic biosecurity risks that waste management practices expose to the environment should be addressed. SCAR should also play a role in identifying the potential for waste to carry NNS out of Antarctica, which is currently given no consideration in the ATS. Waste and pollution management in the marine environment should be a focus of cooperation with the IMO and will be discussed in more detail in Chapter 3.

2.2.1.5 OUTLAWING MARINE HITCHHIKERS: BIO FOULING AND BALLAST WATER

PEPAT does not address two of the most prominent vectors of marine NNS. Stowaway NNS taken on board in ballast and discharged into new environments and sessile and vagile NNS found on the hulls and surfaces of ships have resulted in some of the most significant NNS invasions in other parts of the world.³¹⁷ The lack of regulations governing the latter remains a conspicuous absence in both the international law of the sea and the ATS. Article 9 of PEPAT, Annex IV requires vessels of AT Parties operating in the treaty area to retain “all sludge, dirty ballast, tank washing water and other oily residues and mixtures [and]...garbage,” and dispose of the wastes at an appropriate reception

³¹² Tin, above n 282, 166.

³¹³ Connor, above n 285, 5.

³¹⁴ Annex II, Article 4(1).

³¹⁵ Connor, above n 286, 166.

³¹⁶ PEPAT, Annex III, Article 11 explicitly provides for regular review.

³¹⁷ Shine, above n 4, 7.

facility, but does not address non-oily ballast water where NNS are likely to inhabit. Given the strong causal links between untreated ballast water and NNS introduction,³¹⁸ discharging untreated ballast water in the Antarctic without a permit is arguably contrary to Annex II. The ATCM passed guidelines in 2006 addressing the gap and in response to the adoption of the IMO's Ballast Water Convention.³¹⁹ Although comprehensively addressing the risks of ballast water, the Ballast Water Convention is not yet widely accepted and has considerable limitations in its application to the AT area.³²⁰ The Ballast Water Management Guidelines in the AT Area are designed to put into operation some of the principles of the Convention and its predecessor Guidelines to limit the potential impact of marine NNS in the Antarctic area.³²¹ The Guidelines require Antarctic operators to prepare BWM plans³²², keep a record of ballast water operations³²³ and follow precise guidelines with regards to the exchange of ballast water. It urges exchange before the Antarctic Convergence,³²⁴ 200 metres deep and 200 nautical miles away from land.³²⁵ The cleaning of ballast tanks and consequent release of sediment should not happen in the Antarctic, and vessels that have spent "considerable" time in the Arctic are urged to clean their tanks before they enter the Antarctic area.³²⁶

However, the guidance is limited by the qualifications evident throughout the text³²⁷ and the inadequacy of ballast water exchange as an effective method of mitigating the biosecurity threat of ballast water.³²⁸ Although the provisions are informal they are distributed to all operators by the IMO after the Practical Guidelines were adopted by the Marine Environmental Protection Committee (MEPC) of the IMO in 2007.³²⁹ This extends the ambit of the Guidelines to most operators that engage in activity in the Antarctic area. Prior to the implementation of the guidelines, COMNAP and IAATO performed an analysis of the Ballast Water practices of both tourist and NAP

³¹⁸ See for example: J Carlton 'Transoceanic and Interoceanic Dispersal of Coastal Marine Organisms: The Biology of Ballast Water' (1985) 23 *Oceanography and Marine Biology Annual Review* 313-71.

³¹⁹ ATCM, *The Practical Guidelines for Ballast Water Exchange in the AT Area*, ATCM XXIX Resolution 3 (2006) ('Ballast Water Guidelines in AT Area').

³²⁰ Only 7% of Antarctic Treaty states have ratified the treaty, see **Chapter 3, Section 2.1.4.3.**

³²¹ Ballast Water Guidelines in AT Area, [10].

³²² Ibid, [3]

³²³ Ibid, [4]

³²⁴ Ibid, [5]

³²⁵ Unless "operational reasons" require otherwise, but even then 50 nautical miles from land and at least 200 meters depth). Ibid.

³²⁶ Ibid, [8-9].

³²⁷ For example: ibid, [2, 7, 9].

³²⁸ **See Chapter 3, 2.1.4.2.**

³²⁹ ATCM, *Ballast Water Exchange: Referral to IMO* ATCM XXIX Decision 2 (2006); Marine Environment Protection Committee ('MEPC') to the IMO, *Guidelines for Ballast Water Exchange in the Antarctic Treaty Area*, Resolution MEPC.163(56) (2007).

operators.³³⁰ Out of the 72 ships active in Antarctica, 40 were surveyed and all reported compliance with the Ballast Water Management Guidelines.³³¹ However these reports are not verified by independent observations. Without mandatory obligations to decontaminate ballast water and vessel surfaces and effective compliance mechanisms to ensure the measures are consistently implemented, marine activity will constitute a significant biosecurity threat to the Antarctic continent.

2.2.1.6 RED ALERT: PREVENTING AND RESPONDING TO ENVIRONMENTAL EMERGENCIES

Once an introduction, establishment or invasion is detected, fast and efficient response can have the effect of limiting impacts on native ecosystems.³³² Annex II of PEPAT creates a broad duty to “remove or dispose” of any species introduced without a permit.³³³ However, it does not provide any specific provision for contingency planning in anticipation of inevitable introduction or for the consequences of causing an invasive introduction. Legal obstacles to control are often an issue at the domestic level, with legislation not adequately providing for eradication or rapid response.³³⁴ Annex II prohibits the harmful interference with native flora and fauna without a permit but makes no provision for emergency eradication, containment or control measures in response to a pathogenic or parasitic introduction.³³⁵ The ATS does not provide for any further elaboration of the requirement to take response measures to NNS.

However, PEPAT puts an onus on Parties to cooperate in the preparation of coordinated response action in response to environmental emergencies in the ATA³³⁶ and once in force Annex VI will elaborate the obligation. Whether a NNS introduction should or could be considered an environmental emergency is unclear on the wording of the Annex. The regime should only complement a holistic biosecurity framework, as the manifestation of an invasion is often cumulative and would fail to meet the reasonably exacting standards of an environmental

³³⁰ COMNAP and IAATO, *Information Paper on the Use of Ballast Water* ATCM XXVIII IP 121 (2005).

³³¹ The vast majority do not discharge any ballast water in the Treaty area, 7.5% do not discharge any ballast water brought from outside the Treaty area and 5% only exchange ballast water in the open water; *Ibid*, 1-2 [5].

³³² Shine, above n 4, 69.

³³³ Annex II, Article 4(5); see Section 2.1.2.1 above.

³³⁴ Shine, above n 4, 69-70.

³³⁵ Annex II, Article 3(2): only provides for permits for scientific or cultural reasons or for the “unavoidable consequences of scientific activities...or of the construction and operation of scientific support facilities.”

³³⁶ PEPAT, Article 15.

emergency under the Annex. However, Annex VI also partially implements³³⁷ the commitment in PEPAT to “elaborate rules and procedures relating to liability for damage arising from activities taking place in the Antarctic Treaty area and covered by this Protocol.”³³⁸ The provision for restitution from a polluter for the cost of responding to an invasion is potentially problematic but where the damage is clearly quantifiable, an entirely appropriate method of enforcing response action to an NNS invasion.³³⁹

2.2.1.6.1 NNS INVASION AS AN ENVIRONMENTAL EMERGENCY

The first test to determine whether the scope of liability applies in a biosecurity framework is the extent an introduction of NNS to the Antarctic environment is classified an environmental emergency under the Annex.³⁴⁰ Scientific activity and its associated support activities are explicitly included in the ambit of the environmental emergency.³⁴¹ An environmental emergency is defined as “any accidental event that has occurred, having taken place after the event into force of this Annex, and that results in, or immediately threatens to result in, any significant and harmful impact on the Antarctic Environment.”³⁴² This identifies two significant factors: the proximity of threat and the nature of the damage.

The damage is restricted to the consequences of a sudden accident or incident³⁴³ which excludes a species or pathogen introduced into an environment that gradually establishes and causes cumulative damage to biodiversity.³⁴⁴ This does not, however, exclude NNS invasion completely. Globally, the introduction of NNS, especially pathogens, have the potential to inflict damage on biodiversity in a very short period and could meet the test of “a sudden accident or incident” under the Annex. The damage must also be “significant and harmful,”³⁴⁵ which has been criticised as too high and departing from the terminology of “more than minor or transitory” implemented by the

³³⁷ M Johnston, ‘Liability for Environmental Damage in Antarctica: The Adoption of Annex VI to the Antarctic Environmental Protocol’ *Georgetown International Environmental Law Review* (April 2006).

³³⁸ PEPAT, Annex VI, Article 16.

³³⁹ Shine, above n 4, 34-35.

³⁴⁰ PEPAT, Annex VI, Article 1.

³⁴¹ PEPAT, Annex VI, Article 1, Article 2(c)

³⁴² PEPAT, Annex VI, Article 2(b)

³⁴³ PEPAT, Annex VI, Article 2(b), “threatens in, or immediately threatens to result in...damage...”.

³⁴⁴ L de La Fayette, ‘Responding to environmental damage in Antarctica’ in G Triggs and A Riddell, *Antarctica: legal and environmental challenges for the future* (2007), 135.

³⁴⁵ *Ibid*, 135.

EIA.³⁴⁶ However, ‘significant’ is used by the International Law Commission in its draft Liability Annex,³⁴⁷ and ‘harmful’ only implies that some damage has been done.³⁴⁸ This does not appear to exclude biodiversity loss that might result from NNS invasion. However it might exclude other impacts, such as habitat displacement, translocation of populations or wilderness disturbance. The ambiguous nature of the definition certainly leaves some room for uncertainty. However, where an accidental incident involving invasive species is involved, and it can be demonstrated that there is a clear risk of damaging native populations, this should trigger the requirement of response action and failing that, liability. Moreover, the terminology shifts from “environmental emergencies” to “incidents with potential adverse impacts”³⁴⁹ in respect of establishing contingency plans. An introduction of NNS clearly constitutes a “potential adverse impact”, although it is not clear whether this can apply to something that is not an environmental emergency, given the Annex expressly limits its scope to environmental emergencies.

2.2.1.6.2 BATTLE STATIONS: CONTINGENCY PLANS AND RESPONSE ACTION

Given Annex VI has some application to NNS introductions, the question is to what extent, once it comes into force, it will complement the biosecurity framework. Parties must take “reasonable”³⁵⁰ preventative measures to reduce the risk of environmental emergencies and their potential adverse impact which is arguably the broadest statement of the need to take preventative biosecurity measures in PEPAT. The methods prescribed include specialised equipment, procedures and training³⁵¹ all of which could be employed effectively to exclude biosecurity risks. Moreover, the requirement to establish cooperative contingency plans includes a list of components that should be

³⁴⁶ ASOC, *Analysis of First Antarctic Liability Regime*, ASOC Occasional Paper (2005) <<http://www.asoc.org/Portals/0/pdfs/liability%20regime%20summary0803.pdf>> 5 November 2008; c.f. Bastmeijer lists the 13 terms used to indicate a particular level of risk to the environment, indicating there PEPAT does not treat the definition consistently (above n 69, 194).

³⁴⁷ ILC, Draft principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities, with commentaries (2006) < http://untreaty.un.org/ilc/texts/instruments/english/commentaries/9_10_2006.pdf> accessed 12 November 2009, 122[1].

³⁴⁸ Although assessing whether an impact might be harmful may prove difficult and a significant burden to immediate action; La Fayette, above n 344, 137.

³⁴⁹ PEPAT, Annex VI, Article 4(1).

³⁵⁰ Reasonable, as applied to preventative and response measures is defined in Annex VI, Article 2(e); “actions which are appropriate, practicable, proportionate and based on the availability of objective criteria, including risks to the Antarctic environment and its natural recovery, risks to human life and safety and technological and economic feasibility”; the definition does not significantly depart from the factors involved in an equitable balance of interest in the International Law Commissions (‘ILC’), *Prevention of Transboundary Harm from Hazardous Activities* (2001), Official Records of the General Assembly, Fifty sixth Session, Supplement No. 10 (A/56/10).

³⁵¹ PEPAT, Annex VI, Article 3(2).

part of the plan “when appropriate”.³⁵² Although only providing for the response to a potential pathogen invasion, the “Draft Response Plan in the Event that Unusual Animal Deaths are Recovered” submitted by Australia in the aftermath of the Disease ICG addresses the components of the Annex and the Australian NAP employs specialist equipment, training and procedures to ensure it is carried out effectively.³⁵³ The Annex obliges AT Parties to develop comprehensive contingency plans for response to potential invasion. Thus, the preventative aspects of the Annex lay out a useful set of requirements to take preventative measures to prevent potentially invasive introductions.

In contrast, Annex VI is limited in its provision for response beyond the provision of Annex II.³⁵⁴ The requirement to respond is phrased to allow for liability and so, its final formulation is compromised. There is an obligation for an operator to respond to environmental emergencies arising from the activities of the operator but only “encouragement” for the Party or other Parties to take response action.³⁵⁵ The lag in time between an introduction and an invasion makes a determination of causation difficult. Even where there is a proximal relationship, the provision for liability may make operators unwilling to respond and acknowledge fault. The provision for eradication, containment and control is also inadequate. Response action is defined as “reasonable”³⁵⁶ measures taken after an environmental emergency has occurred to avoid, minimise or contain the impact of that environmental emergency, which to that end may include clean up in appropriate circumstances, and includes determining the extent of the emergency.”³⁵⁷ Although the provision provides for containment, the extent a Party should eradicate or institute longer term control measures is unclear. Some Parties favoured including a requirement to “restore the environment”,³⁵⁸ which could imply eradication or control but the other parties resisted the provision arguing that since there is no obligation in PEPAT to restore the environment, the Annex should not overstep its bounds.³⁵⁹ Even the requirement under the definition of response action, to “clean up in appropriate circumstances”, is controversial.³⁶⁰ Nowhere in Annex VI does it stipulate what Party decides the appropriate circumstances or whether they are “reasonable”. Moreover, there is no indication as to

³⁵² Ibid, Article VI, Article 4(2).

³⁵³ Australia, above n 223.

³⁵⁴ PEPAT, Annex II, Article 4(5).

³⁵⁵ PEPAT, Annex VI, Article 5(1),(2).

³⁵⁶ See above n 347.

³⁵⁷ PEPAT, Annex VI, Article 2(f)

³⁵⁸ New Zealand, Discussion on Liability issue (compilation) ATCM XXIV WP 38 (2001).

³⁵⁹ K N Scott, ‘Liability for Environmental Damage in Antarctica: Annex VI to the Environmental Protocol on Liability Arising from Emergencies’ (2006) 14(3) *Environmental Liability* 87, 91.

³⁶⁰ La Fayette, above n 344, 142-143.

whether clean up could constitute eradication. The limitations and ambiguity in the provision for response greatly reduces the utility of the provisions for an invasion of NNS, but also indicate systematic problems with the Annex that should be addressed in the broader adoption of liability measures under Article 17 of PEPAT.

2.2.6.4.3 LOCKING LEGAL TORPEDOES: LIABILITY

Liability can operate as a “back up system” for international environmental law to assist with the implementation of the concept of “polluter pays” and as an economic incentive for compliance.³⁶¹ For liability to operate effectively in a biosecurity context, it must provide an effective deterrent for operators engaging in activities that have a particular risk of introducing NNS and an incentive to respond to an identified introduction, irrespective of the origin.³⁶² The difficulties of applying traditional liability regimes and the polluter pays concept to NNS are evident in the difficulty of proving causation and the self-propagating nature of an invasion that makes the liability of an introducer limitless.³⁶³ Moreover, there is not much evidence for the preventative or incentive function of liability in international environmental law. Within certain limits, liability regimes have been effective at the domestic level in providing a deterrent for breaching biosecurity rules. For the Antarctic, if any States do take response measures, liability also provides a method of cost recovery. While the response measures only “encourage” other Parties to take action, the provision for liability permits Parties to recover the costs of their action from the responsible operator who did not take prompt response measures which creates an incentive to take action.³⁶⁴ The provision for strict liability avoids the necessity to prove fault and unequivocally holds operators liable for damage caused,³⁶⁵ with certain exceptions.³⁶⁶ Where no action or action that is not prompt or effective is taken, State operators will still be liable for the action which should have been taken.³⁶⁷ The application to non-State operators allows AT Parties more discretion in providing for their nationals

³⁶¹ M Fitzmaurice, ‘International responsibility and liability’ in D Bodansky, J Brunnée and E Hay (eds.), *The Oxford Handbook of international environmental law* (2007), 1034.

³⁶² Shine, above n 4, 29.

³⁶³ S Riley, ‘Invasive Alien Species and the Protection of Biodiversity: the Role of Quarantine Laws in Resolving Inadequacies in the International Legal Regime,’ (2005) 17 *Journal of International Law* 3, 356.

³⁶⁴ PEPAT, Annex VI, Article 6(1),(3).

³⁶⁵ D J Bederman and S P Kesar, ‘Antarctic Environmental Liability: the Stockholm Annex and Beyond’ (2005) 19 *Emory International Law Journal* 1383, 1394.

³⁶⁶ PEPAT, Annex VI, Article 8; The exceptions include any act “necessary to protect human life or safety”, a natural disaster of “exceptional character” that could not have been foreseen, an act of terrorism or belligerency (war), and any act done for the purpose of response action under Article 5(3) of Annex VI.

³⁶⁷ Ibid, Article 6(2)(a).

and only provides for being liable to pay an amount of money “that reflects as much as possible” the cost of response that should have been taken.³⁶⁸ The hypothetical response cost will be paid into “The Fund” to be used to provide for the reimbursement of reasonable and justified costs incurred taking response action pursuant to Article 5(2). The provision of a fund, with the capacity to cover future costs of NNS response where there is no discernible responsible agent and for voluntary payments, provides a further incentive to take response action and reflects a movement towards a more collective form of responsibility envisioned in the reservation of the Antarctic area as a natural reserve. All states must ensure their courts possess the necessary jurisdiction to pursue under both headings of liability for non state operators,³⁶⁹ but state liability may only be resolved in accordance with the enquiry procedure under PEPAT,³⁷⁰ and as applicable, the Schedule to PEPAT on arbitration.³⁷¹ Critically, the sovereign immunity of all ships on government non-commercial service is reiterated in Article 6, excluding any application to scientific support vessels. Applicability in a biosecurity context will require clear guidelines on how to respond to a NNS emergency and what actions should be taken, although the scope of the Annex does not appear to completely preclude the recovery of response costs in circumstances where the cause of an invasion can be ascertained.

2.2.6.7 SUMMARY

The duty to provide a response to environmental emergency may not have clear utility for the issue of NNS but a liability regime could have significant repercussions for biosecurity in Antarctica. The liability regimes’ scope, especially in regards to risks associated with invasive species damage is severely limited. It provides substance to emergency response provision under Article 15 of the PEPAT but does not fulfil the requirements of a comprehensive liability regime under Article 16. It is a significant development, likely to increase best practice in operators, but consideration of more appropriate compliance methods will be necessary for the area of biosecurity. Taking measures to prevent introductions of NNS that could be environmental emergencies is not an effective biosecurity strategy. Although certainly having a place in a comprehensive system, it is not adequate to address the biosecurity in the context of Annex VI. The “no tolerance” approach is the most

³⁶⁸ Ibid, Article 6(2)(b).

³⁶⁹ Ibid, Article 6(1) .

³⁷⁰ PEPAT, Article 18, 19, 20.

³⁷¹ The operation of these procedures is discussed in T Treves, ‘Compulsory Settlement of Disputes: A New Element of the Antarctic Treaty System’ in F Francioni (ed.) *International Environmental Law for Antarctica* (1992).

appropriate and necessary to all NNS introductions, rather than just invasions.³⁷² However, in regard to liability for failing to respond to an emergency, Annex VI is useful for biosecurity.

2.2.2 COMPLIANCE WITH BOTH EYES OPEN: SURVEILLANCE AND INSPECTIONS

Beyond the limited provision for liability, there are few mechanisms within the ATS that provide for ensuring NAPs comply with PEPAT's primary obligations. However, an effective biosecurity framework in an area where nationals are responsible for their own activities relies on AT Parties employing effective measures to ensure their nationals do not breach PEPAT implementing legislation.³⁷³ The AT and PEPAT provide for AT Parties to take appropriate measures to ensure compliance.³⁷⁴ However, other than requiring "regular and effective monitoring" to assess the impacts of ongoing activities and "facilitate early detection of unforeseen effects of activities," the instrument does not provide for how this compliance should be implemented. The role of informal mechanisms, particularly the provision for education and "developing attitudes" is a traditional strength of the ATS and is an important attribute to a biosecurity regime.³⁷⁵ However, inspections and legal sanctions for breaches are also essential for the purposes of ensuring rules on biosecurity are complied with.³⁷⁶ Where AT Parties "dispute the implementation or application" of the mining prohibition, EIA process, emergency response, or any of the provisions of the Annexes, PEPAT employs compulsory notification and dispute resolution procedures in the place of any rigid sanctions.³⁷⁷ To allow AT Parties to identify potential breaches, the AT and PEPAT employ an open inspection regime and PEPAT requires AT Parties to report on the steps they have taken to implement of PEPAT.³⁷⁸ As the concept of an independent inspectorate body was rejected in the negotiation of PEPAT,³⁷⁹ other AT Parties play an important role in supervising activity in the Antarctic area.

³⁷² Australia, France and New Zealand, above n 1, 2.

³⁷³ K Bastmeijer, above n 71, 366.

³⁷⁴ AT, Article X; PEPAT, Article 13.

³⁷⁵ W M Bush, 'Means and Methods of Implementation of Antarctic Environmental Regimes and national Environmental Instruments: An Exercise in Comparison' in J Verhoeven, P Sands and M Bruce (eds.) *The Antarctic Environment and International Law* (2000), 38; see USA, *NNS Awareness Campaign: "Don't Pack a Pest" When Travelling to Antarctica*, ATCM XXXI IP 93 rev. 1 (2008).

³⁷⁶ Shine, above n 4, 81.

³⁷⁷ PEPAT, Article 13(3-4); Article 19, 20; Schedule to the Protocol, Arbitration.

³⁷⁸ PEPAT, Article 17.

³⁷⁹ Vicuña, above n 39, 52; C.f. The CRAMRA system allowed designation of inspectors by the Commission itself, or by the relevant Regulatory Committees promising a more independent and consistent system of inspection; CRAMRA, Article 12(1)(b).

2.2.2.1 SELF DIAGNOSIS: MONITOR AND REPORT

Whether the reporting regime permits AT Parties to identify breaches in NAPs procedures depends on whether the NAPs monitor for biosecurity threats and NNS presence. PEPAT requires broad, targeted monitoring for activities within an AT Parties control.³⁸⁰ The importance of regular monitoring for biosecurity is well established. The faster a biosecurity threat is identified, the less NNS risk is exposed. Moreover, the longer an NNS remains undetected, the higher possibility it will establish and potentially become invasive.³⁸¹ Although identifying the presence of NNS or biosecurity threats is not expressly invoked in the text of the instrument, the Guidelines on Implementing Monitoring Regimes expressly identifies NNS as a potential indicator of biodiversity damage, with “species, distribution, and population size” as the relevant parameters.³⁸² However, in an example incorporating NNS risks, the guidelines do not distinguish between transient and persistent organisms and the likelihood, consequences and “impact rating” of NNS are rated low.³⁸³ Nevertheless, as PEPAT creates a duty for states to monitor the impacts of their activities and “report annually on the steps taken to implement [PEPAT]”,³⁸⁴ AT Parties are given the opportunity to identify areas of weakness in other AT Parties biosecurity approaches. The provision for “consideration” at the ATCM promotes a robust discussion of AT Parties approaches to biosecurity.³⁸⁵ However, the reports vary significantly and consequentially have never been comprehensively “considered” at the ATCM.³⁸⁶ The AT Secretariat has taken steps to rectify this issue by providing a consistent format and wide availability through the Electronic Information Exchange System (EIES) but has yet to comprehensively analyse the information gathered.³⁸⁷ Potential methods of developing the reporting requirement for the biosecurity framework will be evaluated in Chapter 5 of this thesis.

2.2.2.2 EYES ON THE OTHER: INSPECTION UNDER PEPAT

³⁸⁰ Article 3(2)(c)(v)[new activities] (d-e) [ongoing activities]; Annex I, Article 5; Guidelines on EIA.

³⁸¹ Shine, above n 4, 66.

³⁸² ATCM, COMNAP Practical Guidelines for Developing and Designing Environmental Monitoring Programmes in Antarctica ATCM XXVII Resolution 2 (2005), 8.

³⁸³ Ibid, 9.

³⁸⁴ PEPAT, Article 17(1); ATCM, Information Exchange Requirements, Appendix 4 of Final Report of the XXVI ATCM (2001).

³⁸⁵ PEPAT, Article 17(2)

³⁸⁶ Bastmeijer, above n 71, 380.

³⁸⁷ AT Secretariat, Electronic Information Exchange System: A report on the first operational season ATCM XXXII SP 8 (2009); ATCM, Electronic Information Exchange System: Start of Operations ATCM XXXI Decision 5 (2008); ATCM, Electronic Information Exchange System ATCM XVIII Decision 10 (2005).

The most important provision for supervising the implementation of the ATS is the inspection regime. While enforcement is more difficult in an area without a sovereign authority, a strong, strategic inspection regime informed by biosecurity provisions has the advantage of independent supervision of governmental activity. Moreover, an inspection regime can serve a dual purpose for a biosecurity framework: ensuring compliance and providing for independent surveillance. Both purposes rely on the regime strategically identifying biosecurity threats and NNS presence throughout human activity in the Antarctic area. However, there is no requirement to engage in inspections and certainly no strategic approach to the inspections. Not all Parties engage in inspections and not all stations are inspected on a regular basis.³⁸⁸ The geographic scope of the inspection regime is also limited; inspectors or designated “observers”³⁸⁹ have the freedom to go anywhere in the Antarctic continent³⁹⁰ under the jurisdiction of their State but ships and aircraft inspections are limited to ‘points of discharging or embarking cargoes or personnel in Antarctica’.³⁹¹ The scope has been criticised as only provides for the inspection of AT Parties vessels and only in a very specific operational and geographic area, although non-Party flagged vessels have been inspected with the permission of the ship’s masters.³⁹² Although vessels supporting science can be inspected under the provision, since PEPAT came into force only 2 vessels supporting science have been inspected.³⁹³ The difficulty enforcing and carrying out inspections in the Antarctic area highlights the need to identify alternate locations for inspection. The port that vessels and planes depart from before arriving in Antarctica is a useful gateway for AT Parties to implement inspections focussed on biosecurity. Although PEPAT and the AT restrict inspection provisions to the Antarctic area,³⁹⁴ the broad requirement to take measures to ensure compliance under Article 13 of PEPAT

³⁸⁸ Bastmeijer, above n 71, 377; Since PEPAT came into the force to the last available inspection (2008/9 season), 12 AT Parties have carried out 11 inspections on 59 stations, 10 vessels and 22 protected areas, some of which are joint inspections. However, many of those stations have been inspected more than once, in particular China’s Great Wall station (4), the Russian Federation’s Bellinghausen station (4), the United Kingdom’s Rothera station (3) and Spain’s Juan Carlos I station (3), which means only 75% of the active stations have been inspected since PEPAT came into force. See *Appendix 3: Biosecurity content of inspection reports since PEPAT came into force* for more information.

³⁸⁹ PEPAT, Article 14(2); either nationals of a Party or designated at a ATCM.

³⁹⁰ Ibid; AT, Article 7(2-3).

³⁹¹ Ibid.

³⁹² Vicuña, above n 39, 55; L Cordonnery, ‘Environmental Protection in Antarctica: Drawing Lessons from the CCAMLR Model for the Implementation of the Madrid Protocol’ (1998) 19 *Ocean Development and International Law* 136; ASOC, *Port State Control: An Update on International Law Approaches to Regulate Vessels Engaged in Antarctic Non-Governmental Activities* ATCM XXVI/IP 44 (2003).

³⁹³ See *Appendix 3: Biosecurity content of inspection reports since PEPAT came into force*.

³⁹⁴ AT, Article VI (3); PEPAT, Article 14(1).

could be construed as to justify inspection at gateway ports.³⁹⁵ The suitability of the port as a gateway will be discussed in detail in Chapter 3.

Another useful attribute for an inspection regime, common at a domestic level, is identifying relevant breaches in legislation and pursuing legal sanctions. Under PEPAT, observers can only send a report to Parties that after incorporating comments are forwarded to the all the Parties, CEP and ATCM for consideration.³⁹⁶ There is no evidence in the reports of any observers considering the relevant domestic legislation and identifying potential breaches. AT Parties might, for instance, be under an obligation to take certain biosecurity measures under a national framework that goes beyond the requirements of PEPAT. The Guidelines adopted by the ATCM to support inspections do not recommend identifying the domestic Antarctic legislation, the only relevant provisions providing an assessment of “understanding [the] provisions of the [AT] and related agreements,” and the “availability of AT documentation on station.”³⁹⁷ Moreover, despite covering possible vectors of NNS and additional Guidelines assisting the inspection of protected areas that are potentially vulnerable to invasion,³⁹⁸ the Guidelines stop short of providing a requirement to monitor biosecurity threats and NNS. Of the inspections carried out by AT Parties since PEPAT, only a few have identified biosecurity threats and the consequent potential breach of PEPAT and no subsequent discussion in the CEP or ATCM indicated these risks were resolved.³⁹⁹ Every inspection report treats the issue separately, all address the generic biosecurity threats of sewage discharge and waste disposal but not all identifying the potential for introducing NNS, others note the presence of NNS near or on the station but none comprehensively examine the potential vectors for introduction. Subsequent inspections of Bellinghausen and Great Wall station indicate despite observers noting pot plants may breach PEPAT rules; no attempts to remove the potplants were undertaken. The reports can certainly have a political impact but clear primary obligations, an analogous strategic inspection process and incorporation of results into the decision making process is required before the instrument can be used adequately for biosecurity purposes.⁴⁰⁰

³⁹⁵ See for example: Vicuña, above n 39, 55.

³⁹⁶ PEPAT, Article 14(4).

³⁹⁷ *Antarctic Inspection Checklist* ATCM XIX Attached to Resolution 5 (2006), Element 15.

³⁹⁸ ATCM, Checklist to assist in the inspection of ASPA and ASMA ATCM XXXI Attached to Resolution 4(2008)

³⁹⁹ See Appendix 3: Biosecurity content of inspection reports since PEPAT came into force.

⁴⁰⁰ ASOC, *The Case for Strengthening the Mechanisms for Conducting Inspections under the Protocol* ATCM XVIII IP 95 (1994).

2.2.2.3 COMPLIANCE WITH BOTH EYES OPEN: SUMMARY

Supervising and enforcing PEPAT biosecurity is challenging in an area without a sovereign authority. The ATS relies on States monitoring their own activities and implementation of PEPAT and other States implementation of PEPAT and then reporting that in a sufficiently consistent form to analyse the results collectively. The problem with leaving an issue like monitoring to state diligence is the tendency for states to minimise the application of the law. Without clearly defined goals in the inspection, monitoring and reporting process; a tick box reading “Presence of NNS in vicinity of base or field camp or on hull,” even a diligent national operator will not engage in serious analysis of the local situation as the prioritised elements of the surveillance and inspection will take precedence.⁴⁰¹ Movement towards a more systematic and strategic form of reporting and inspection is a possible solution to these problems and could address the risk of NNS establishing effectively.⁴⁰²

2.2.7 NATIONAL ANTARCTIC PROGRAMS AND BIOSECURITY: CONCLUSION

NAP activity is in many ways, a manifestation of the freedom of science that underlies the ATS and has maintained peaceful cooperation in the Antarctic since the 1950s. However, treaties are living instruments and the commitment to comprehensive environmental protection in PEPAT does not exclude application to scientific activity. Article 3 of PEPAT implicitly provides for a proactive approach to the prevention, surveillance and response to NNS. Scientists and their support networks must take this into account in the planning and engaging of all activities. Annex II in particular provides for prevention and surveillance of NNS, prohibiting introduction without a permit and providing that Parties should take certain specified measures to avoid unintentional introductions of micro-organisms. However, most of the provisions only deal with the issue implicitly and do not create binding obligations for the Treaty parties.⁴⁰³ Diligence is required in the ATCM and CEP to ensure the issue is dealt with more comprehensively.

⁴⁰¹ France, et al, *Report of the CEP and SC-CAMLR Joint Workshop*, ATCM XXXII WP 55 (2009) ('Joint CEP and SC-CAMLR Workshop'), 8.5.

⁴⁰² For example: K N Scott, 'Institutional Developments within the Antarctic Treaty System' (2003) 52 *International Comparative Law Quarterly* 473, 486.

⁴⁰³ Mansfield and Gilbert, above n 7, 142.

2.3. ANTARCTIC TOURISM AND BIOSECURITY

Regulating the specific biosecurity threats associated with tourist activities poses a significant challenge to AT Parties. The particular aspects of tourism which increase biosecurity threats, discussed in Chapter 1, include the intensity of the activity at certain areas and the widening scope of the industry.⁴⁰⁴ There is a distinct lack of information on the spatial pattern of tourist marine traffic in relation to landings, passengers ashore and passenger activities compounding the limited knowledge of specific biosecurity threats posed by tourist activity.⁴⁰⁵ However, although expressly prioritising scientific activity over other forms of activity in the Antarctic,⁴⁰⁶ AT Parties have not applied a precautionary approach to tourist activity.⁴⁰⁷ In fact, the regulation of the specific environmental issues associated with tourism by AT Parties has been largely reactive and unstructured.⁴⁰⁸ AT Parties jurisdiction is limited as many of the companies are incorporated in, and their vessels flagged to, countries not party to the AT.⁴⁰⁹ Thus, IAATO plays an important role in the regulation of tourism providing mandatory biosecurity measures and a compliance regime for all its members. While non-party flagged operators are not obliged to abide by the ATS,⁴¹⁰ IAATO is committed to “to operat[ing] within the parameters of the [ATS]”.⁴¹¹ The proactive focus of the organisation on ecologically sustainable tourism is partially responsible for the limited ATS regulation.⁴¹² One category of tourists that are not addressed by the ATS or the tourist industry are small yachts which, without the industry organisation’s compliance processes or necessarily AT Party regulation, could pose a significant biosecurity threat, despite their small size. This section will discuss the relevant parts of the ATS and IAATO that target specific biosecurity threats arising from tourism, and briefly establish the importance of the mandatory ATS regulation in developing a biosecurity framework.

⁴⁰⁴ Frenot, above n 3, 14-15.

⁴⁰⁵ H J Lynch, K Crosbie, W F Fagan and R Naveen, ‘Spatial patterns of tour ship traffic in the Antarctic Peninsula region’ (2009) 8 *Antarctic Science* 1, 7.

⁴⁰⁶ PEPAT, Article 3(3).

⁴⁰⁷ S V Scott, ‘How Cautious is Precaution: Antarctic Tourism and the Precautionary Principle,’ (2001) 50 *International and Comparative Law Quarterly* 967, 973.

⁴⁰⁸ E J Molenaar, ‘Sea-borne Tourism in Antarctica: Avenues for Further Intergovernmental Regulation’ (2005) 20 *International Journal for Marine and Coastal Law* 2.

⁴⁰⁹ See Chapter 3, Section 3.1.

⁴¹⁰ See above section 1.1; P J Beck, ‘Managing Antarctic Tourism: A Front-Burner Issue,’ (1994) 21(2) *Annals of Tourism Research* 382.

⁴¹¹ IAATO, *IAATO Bylaws* (2009), <<http://www.iaato.org/bylaws.html>> Accessed 10 February 2010 (‘IAATO Bylaws’); Article II (B).

⁴¹² Beck, above n 410, 384; Although not all tourist vessels are members of IAATO; ASOC, *Tourism and Land-based Facilities in Antarctica* ATCM XXXII IP 23 rev. (2009), 3.

2.3.1 WITHIN THE ATS: REGIONAL REGULATION OF TOURISM

The ATS only directly regulates the specific biosecurity threats of tourism through education but indirectly provides for limiting biosecurity through required planning processes and site management. The only explicit identification of the threats posed by NNS is found in educational guidelines adopted by the ATCM. The general guidelines prepared for tourist operators urge compliance with PEPAT and the Antarctic Visitor Guidelines advise tourists to “...not bring non-native plants or animals into the Antarctic (e.g. live poultry, pet dogs and cats, house plants).”⁴¹³ The application of PEPAT planning processes permit the restriction of the increasing scope of the industry to a certain extent and site guidelines and limits on numbers at a site at any given time target the intensity of the industry. The lack of strategy behind the regulation of tourism is partially addressed in the “General Principles of Antarctic Tourism” to “inform and guide further work in managing Antarctic tourist activities.”⁴¹⁴ One point that invokes biosecurity provision is that “tourism should not be allowed to contribute to the long term-degradation of the Antarctic environment and its dependent and associated ecosystems, or the intrinsic natural wilderness...”⁴¹⁵ The principles urge a precautionary, pragmatic approach in response to uncertain risks and “an evaluation of risks.”⁴¹⁶ If the guiding provision is to be taken to imply anything for implementing tourist regulation, it is to promote a careful risk assessment of approved tourist activity, particularly evaluating how it might introduce NNS. The adoption of such an approach to biosecurity threats will assist the development of tourist regulation and will be discussed in Chapter 5 of this thesis.

2.3.1.1 LIMITING THE SCOPE OF IMPACTS: PLANNING PROCESSES

Although the relevant tools of PEPAT apply to tourist activity, the application is not entirely appropriate. The relevant planning considerations under Article 3 of PEPAT certainly apply to tourism. States are obliged to plan and conduct tourist activity to limit adverse impacts, including the introduction of NNS.⁴¹⁷ A strategic process should identify the risks associated with tourist activity and attempt to mitigate those risks with a precautionary approach, including potentially limiting the geographic range and type of tourist activities carried out.⁴¹⁸ Certainly the PEPAT

⁴¹³ ATCM, *Guidelines for Visitors to the Antarctic* ATCM XVIII Recommendation 1 (1994), [A(5)]

⁴¹⁴ ATCM, *General Principles of Antarctic Tourism* ATCM XXXII Resolution 7 (2009).

⁴¹⁵ *Ibid* [2].

⁴¹⁶ *Ibid*.

⁴¹⁷ PEPAT, Article 3(2); See 2.1.1.

⁴¹⁸ Hemmings and Roura, above n 140, 20.

prescribed procedures for waste management and ship borne pollution are relevant in limiting the biosecurity risks of activities. Moreover, the IMO ban on heavy fuel oil will indirectly decrease the risks posed by the industry by eliminating a number of the larger tour vessels from the Antarctic market.⁴¹⁹ However, the prescribed process for engaging in activity is the EIA and the limitations of the PEPAT EIA process are compounded for tourist activity.⁴²⁰ Permanent land-based tourist activities and a broader range of activities could significantly increase the potential for NNS introduction⁴²¹ and are adequately addressed by a consistently implemented EIA process. The risk of cumulative impacts, particularly the “gradual establishment of new microbial or plant communities through incidental introductions over time” is less efficiently targeted by an EIA process that focuses on discrete operators and activities.⁴²² A more strategic and holistic impact analysis is necessary but the ATS does not require strategic analysis across tourist activity.⁴²³ Moreover, inconsistencies with respect to the implementation of EIA procedures complicate its application and impact on decision making. Some AT Parties require prior environmental approval, with regulatory bodies issuing conditional permits for activity after the submission of an EIA.⁴²⁴ Arguably this at least permits a consideration of the strategic impact of tourism and incorporation of the consideration into decision making. However, a significant proportion of operators are based in the United States which does not require a permit and is satisfied with the overall EIA submitted by IAATO.⁴²⁵ There is also very little consistency amongst the biosecurity content of EIA submissions.⁴²⁶ The amount of EIA submissions also remains relatively low given the quantity of tourist operations.⁴²⁷ The problem is

⁴¹⁹ IAATO, IAATO Overview of Antarctic Tourism: 2009-10 Season and Preliminary Estimates for 2010-11 and Beyond ATCM XXXIII IP 113(2010), 3.

⁴²⁰ D J Enzenbacher, ‘Antarctic tourism policy-making: current challenges and future prospects’, in G. Triggs, and A. Riddell, *Antarctica: legal and environmental challenges for the future* (2007), 159.

⁴²¹ Hemmings and Roura, above n 140, 5.

⁴²² D McIntyre, M McIntyre and A Broadbent, IEE Australian Non-Governmental Operations in Antarctica: “MV Orion 2008/09” (2008), 20.

⁴²³ Hemmings and Roura, above n 140, 21; IAATO submits an annual programmatic EIA on behalf of all its members to the United States; e.g. IAATO, above n 419.

⁴²⁴ W A Polk, ‘Welcome to the Hotel Antarctica: The EPA’s Interim Rule on Environmental Impact Assessment of Tourism In Antarctica,’ (1998) 12 *Emory International Law Review* 1421; Australia, Germany, the Netherlands, New Zealand, Norway, Sweden, and the United Kingdom; Figure taken from IAATO, *IAATO membership database* (2009) <<http://apps.iaato.org/iaato/directory/list.faces;jsessionid=B96F410AAC938AE93D828059EA387CC5.iaato2>> at 28 November 2009.

⁴²⁵ 29 out of the 108 current members are based out of the United States; IAATO, *ibid*.

⁴²⁶ Hemmings and Roura, above n 140, 21.

⁴²⁷ A total of 31 EIA’s were submitted under the heading “Tourism” in 2009, up from 31 in 2008 and 27 in 2006. Antarctic Treaty Secretariat, AT Secretariat, *EIA Database* <http://www.ats.aq/devAS/ep_eia_list.aspx?lang=e> at 4 March 2010; It should be noted this is not a reflection on the total number of companies submitting, some companies submitted multiple EIA’s for different voyages and the IAATO overall document may be considered a substitute for non-Treaty Party company’s submissions. IAATO, above n 419, 4.

further illustrated in the inspection process. Inspections are carried out on non-AT Party flagged ships with the approval of the Master but only certain biosecurity threats are generated by stationary tourist vessels and no analysis of the fouling of hulls has been reported by any observer.⁴²⁸ There is no requirement to include biosecurity conditions on environmental approvals and no compliance measure to ensure those conditions are being implemented effectively. The ATME on Ship Borne Tourism recommends the development of a specific checklist for inspections of tourist operations and the implementation of existing port state measures on tourist vessels but in the absence of adequate port state control provisions for biosecurity,⁴²⁹ compliance is still a considerable gap in the system.

Another limitation of the ATS regulation of tourism is in the absence of express provision for surveillance, preparation and response to introductions. The generic PEPAT requirement to provide for regular and effective monitoring in the planning of activities⁴³⁰ is supported by an adopted ATCM resolution provides a template for reporting of ships activity.⁴³¹ However, without any provision on the template for the identification of “key environmental parameters and ecosystem components,”⁴³² AT Parties are not required to provide for strategic biosecurity monitoring. The provision for contingency plans, response and failing response, liability is also restricted. Although tourist activities are explicitly included in the ambit of Annex VI, the application of the Annex to non-State actors is limited.⁴³³ Non-AT Party flagged vessels are contemplated in the formulation,⁴³⁴ but several significant differences between the triggers of State and non-State operators’ liability collectively permit States to adopt a less rigorous liability regime for tourist vessels under their jurisdiction.⁴³⁵ Moreover, the organisers of the tourist expedition are the targeted group under the ambit of Emergency Liability, not the captain of the vessel, nor the crew or the tourists themselves, which limits the deterrent effect of the provisions on the individuals in the AT area.⁴³⁶ There are no specific contingency or response measures for dealing with an emergency NNS incident caused by a

⁴²⁸ See Appendix 3: Biosecurity content of inspection reports since PEPAT came into force.

⁴²⁹ Chairs’ Report of Antarctic Treaty Meeting of Experts on Ship Borne Tourism in the Antarctic Treaty Area (2009) (‘Report of ATME Ship Borne Tourism’), Recommendation 2, 6.

⁴³⁰ PEPAT, Article 3(2)(e).

⁴³¹ ATCM, *Post Visit Site Report Form* ATCM XXVIII Resolution 5 (2005).

⁴³² PEPAT, Article 3(2)(c)(v).

⁴³³ PEPAT, Annex VI, Article 1.

⁴³⁴ “Jurisdiction can be based on both place of incorporation and the state that authorised the Antarctic travel,” PEPAT, Annex VI, Article 7(1).

⁴³⁵ Johnston, above n 334.

⁴³⁶ La Fayette, above n 344, 134.

tourist vessel, although a more rigid system of environmental response measures is in the process of development.⁴³⁷

2.3.1.2 TARGETING INTENSITY: LIMITING ACTIVITY AT CERTAIN SITES

The most proactive aspect of tourist regulation within the ATS, relevant to biosecurity, is the provision of site-specific guidelines and adoption of the IAATO standard limitations on landings.⁴³⁸ Tourist activity tends to focus on specific areas of aesthetic interest where biosecurity risks are acute.⁴³⁹ The higher intensity the activity in an area, both in terms of different ships visiting an area and numbers of visitors ashore, increases the risk of inadvertent introduction of NNS.⁴⁴⁰ The measure, yet to come into effect, recommends States prohibit any ship with over 500 passengers from making landings and limit any landing location to one ship and 100 passengers at a time with a 1 to 20 guide to passenger ratio.⁴⁴¹ Although States that require environmental approval can issue permits with the conditions of the measure, States that do not issue permits might have more difficulty implementing this measure. However, the provision is complemented with site specific protection through the protected area process and specific site guidelines.

AT Parties have an obligation to protect “aesthetically valuable” areas under PEPAT and an area specific focus to tourist management can do something to mitigate the potential impacts of intensive visitation.⁴⁴² Areas of Special Tourist Interest were created to limit tourism to certain sites and monitor the impacts of intense tourism⁴⁴³ but were not used and “lapsed into obscurity” after the negotiation of PEPAT.⁴⁴⁴ Certainly, protected area provisions are as relevant to tour operators and tourists as scientists and their support staff, although if operators are not registered to AT Parties, the practical impact of the provisions is lessened. As indicated above, the designation of an ASPA potentially provides for the most robust biosecurity consideration in the ATS, with certain limitations. ASPAs requiring permits conditional on biosecurity could mitigate the issues with the EIA

⁴³⁷ Report of ATME on Ship-Borne Tourism, 9.

⁴³⁸ ATCM, Landing of Persons from Passenger Vessels, ATCM XXXII Measure 15 (2009).

⁴³⁹ Frenot, above n 3, 58-59.

⁴⁴⁰ Ibid, 59.

⁴⁴¹ Landing of Persons from Passenger Vessels, above n 436.

⁴⁴² PEPAT: Article 3(1); Article 3(2)(b)(iv); Annex V, Article 3(1).

⁴⁴³ ATCM, *Statement of Accepted Practices in Tourism*, ATCM VIII Recommendation 9 (1975).

⁴⁴⁴ M G Richardson, ‘Regulating Tourism in the Antarctic: Issues of Environment and Jurisdiction’, in D Vidas (ed.) *Implementing the Environmental Protection Regime for the Antarctic* (2000), 74.

process. Some ASPAs include specific tourism zones,⁴⁴⁵ and the introduction of “educational values” into ASPAs demonstrates that AT Parties recognise the need to protect the value certain areas have to tourist operations.⁴⁴⁶ However, AT Parties rejected large ASPAs in tourist areas as too restrictive for tourist activities.⁴⁴⁷ Although the value of the ASMA system for regulating tourism has been stressed,⁴⁴⁸ without requiring a permit for entry, the system does not adequately compensate for the limitations of the EIA process.⁴⁴⁹

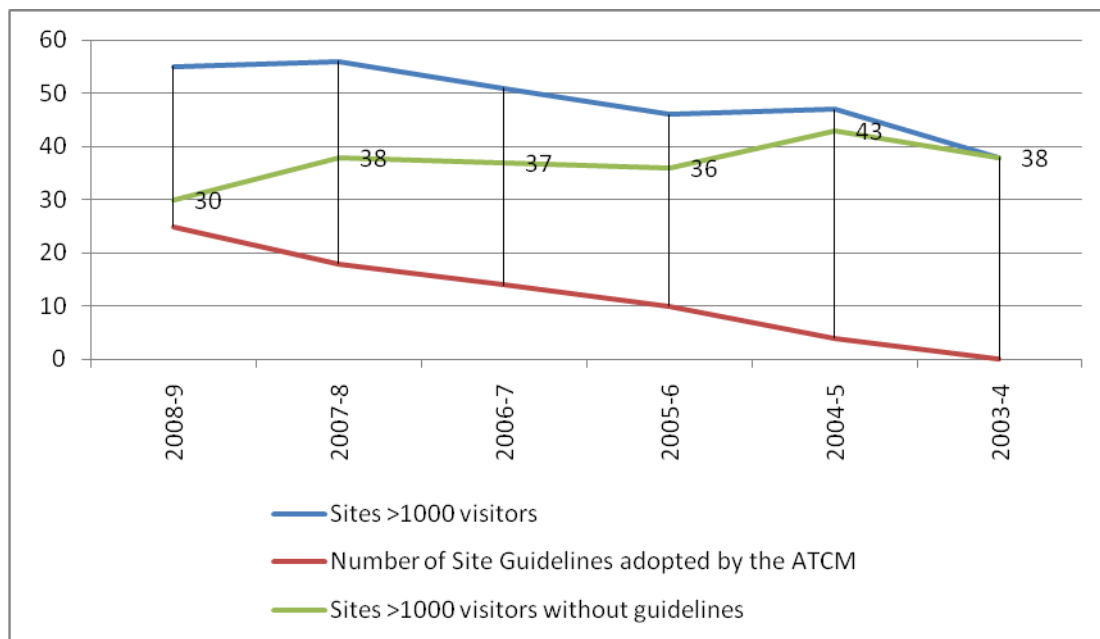


FIGURE 2.1: RESPONSIVENESS OF THE ATS TO LARGE SCALE TOURIST ACTIVITY THROUGH SITE GUIDELINES⁴⁵⁰

To complement the protected area provisions, the ATCM has developed site specific guidelines giving “practical guidance [to tourist operators] on how they should conduct their activities within” certain sites of high tourist visitation.⁴⁵¹ In practise this has supplanted consideration of formal area protection and does not provide for a legally rigorous requirement to take into account biosecurity

⁴⁴⁵ See for example: ATCM Revised Management Plan for ASPA No. 150, Ardley Island, Maxwell Bay, King George Island, WP 25ATCM XXX (2007), Map 2.

⁴⁴⁶ ASOC, Managing Antarctic Tourism: A Critical Review of Site-Specific Guidelines ATCM XXX IP 65 (2006), 3.

⁴⁴⁷ United Kingdom, *Future Management of Deception Island*, ATCM XXII IP 8 (2000), Management Option 7.

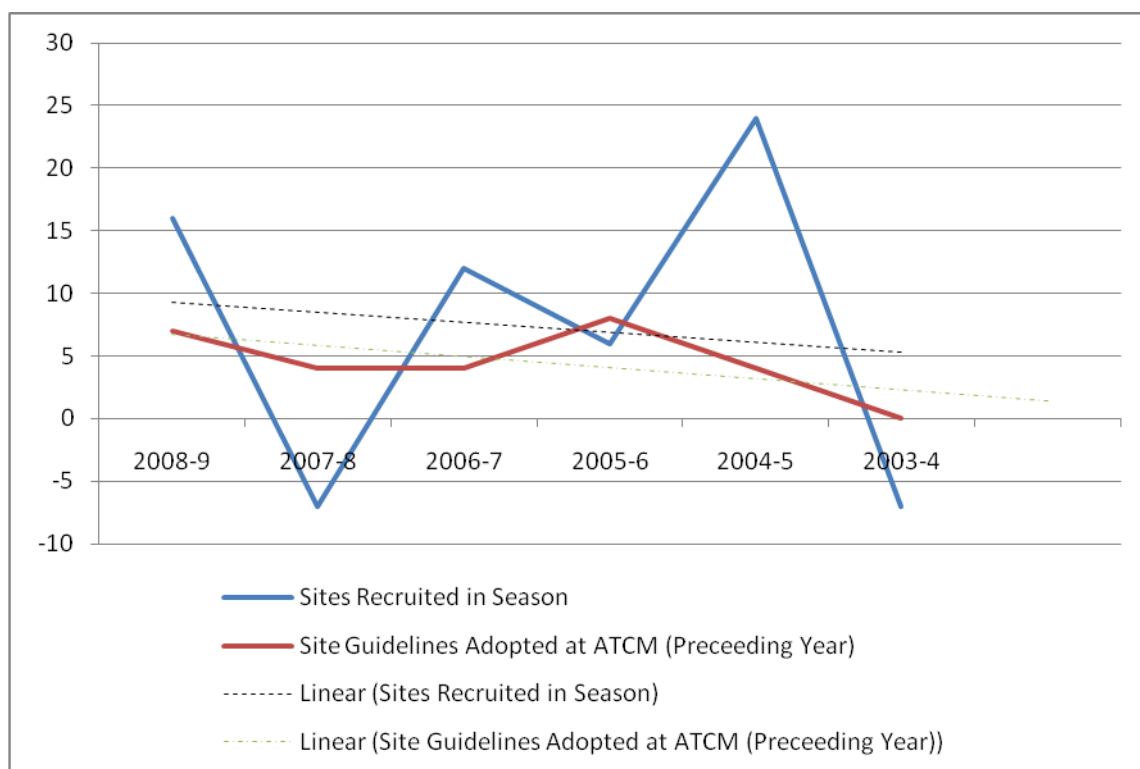
⁴⁴⁸ Richardson, above n 444, 81.

⁴⁴⁹ Bastmeijer, above n 71, 302.

⁴⁵⁰ See Appendix 4: Tourism Statistics Analysis.

⁴⁵¹ ATCM, *Site Guidelines for Visitors*, XXVIII ATCM Resolution 5 (2005), Preamble.

threats in decision making or operations. Guidelines pose different restrictions depending on the nature of the area and are updated to “reflect readily changing environmental circumstances” through the CEP.⁴⁵² If site specific guidelines inform visitors about specific characteristics of an area and the NNS risks associated with certain types of activities, they can be useful in a biosecurity context. They also provide another opportunity for AT Parties to identify comprehensive biosecurity requirements for interaction with specific populations. The site guidelines model is an organic and flexible framework that is supported by the industry.⁴⁵³ As Figure X demonstrates, the site guidelines have allowed AT Parties to progressively address intensively utilised sites without the lengthy negotiation required for ASPA or ASMA designation. IAATO reported almost universal implementation of the guidelines in the 2007-8 seasons; although IAATO and station personnel have noted breaches.⁴⁵⁴



⁴⁵² Ibid, [3-4]

⁴⁵³ D Haase, *Tourism in the Antarctic: Modi Operandi and Regulatory Effectiveness* (D Phil Thesis, University of Canterbury, 2008), 139.

⁴⁵⁴ IAATO, *Brief Update on the Antarctic Peninsula Landing Site Visits and Site Guidelines ATCM XXX IP 114* (2007), 2; Haase, *ibid*, 140.

FIGURE 2.2: IMPACT OF SITE GUIDELINES ON SITE RECRUITMENT

The effectiveness of a protected areas system outside the process of Annex V has certain limitations. Firstly, the strategy behind the site specific guidelines process is flawed. Rather than proactively identifying suitable sites for certain activities and developing sustainable guidelines, Parties have strategically settled on reactive management. However, the nature of the Lindblad model of tourism promotes the exploration for new sites of interest.⁴⁵⁵ With larger vessels likely to phase out with the ban on heavy fuel oil, the focus of the industry is likely to shift back to the traditional exploration model.⁴⁵⁶ If the identification of new sites and establishment of regular visitation areas exceeds the development of site-specific guidelines, it is likely that a considerable amount of NNS risk will go unaddressed. The above graph demonstrates that the growth in tourism over the last six years has not been matched by management processes.⁴⁵⁷ The growth in total number of sites utilised, as well as visitors and sites with over 1000 visitors, demonstrate the trend described above: a consistent rate of new sites being established and an increase in the number of visitors to each site.⁴⁵⁸ Managing the intensity of tourism appears to be having the impact of spreading the scope of the biosecurity risk.

TABLE 2.4: ANALYSIS OF IAATO TOURIST TRENDS FROM 2003-2009⁴⁵⁹

Season	2008-9	2007-8	2006-7	2005-6	2004-5	2003-4
Total visits to all sites ⁴⁶⁰	340634	379626	326331	237412	174355	223166
Total sites	202	186	193	181	175	151
Sites with over 1000 visitors	62	56	52	46	47	38
Guidelines adopted by the acceding ATCM (Sites Remaining)	7 (177)	4 (168)	2 (179)	8 (169)	4 (175)	0 (151)
Average visitors per site	271	308	274	233	210	234

Moreover, the presence of site guidelines does not appear to have a significant impact on the quantity of tourists visiting sites, with some becoming more popular after being protected⁴⁶¹ and

⁴⁵⁵ ASOC, Managing Antarctic Tourism: A Critical Review of Site-Specific Guidelines ATCM XXX IP 65 (2006), 5.

⁴⁵⁶ Ibid, 6.

⁴⁵⁷ C.f. IAATO, Update on Antarctic Peninsula Landing Site Use and Site Guidelines ATCM XXXI IP 82 (2008).

⁴⁵⁸ C.f. Figure 4; IAATO's multi variable factor analysis demonstrates the insignificance of the increase in recruited sites, compared to increase in tourist numbers and voyages in the period 1989-2008. Ibid, 2.

⁴⁵⁹ Tourism statistics available at: < http://www.iaato.org/tourism_stats.html>; adapted from ASOC, *Managing Antarctic Tourism: A Critical Review of Site-Specific Guidelines* ATCM XXX/IP 65 (2006), Appendix 1.

⁴⁶⁰ Most visitors visit more than one site,

⁴⁶¹ For example: Paulet Island, which went from an average of 3665 visitors in the three years prior to Site Guidelines being adopted to 6117 visitors in the three years after being protected. *Appendix4: Tourism Statistics Analysis*

others decreasing in popularity.⁴⁶² Overall, there is a slight increase in the average number of visitors per year after a site is protected with guidelines.⁴⁶³ It is appropriate that site guidelines remain flexible to respond to changing circumstances “such as increased tourist pressure or demonstrable environmental impact”⁴⁶⁴ but the approach currently substitutes more comprehensive protection. Antarctic-wide biosecurity measures are necessary, rather than site specific guidelines identifying NNS issues in isolation. Tourism area protection needs to be managed in a strategic way to decrease the spread of activity to areas that may pose significant risks to indigenous species. Nevertheless, site specific guidelines remain a powerful tool to reduce the impact of tourist groups on high intensity areas. The site guidelines should complement comprehensive biosecurity measures and ASPA and ASMA designations in proactively identifying and conserving ecologically sensitive areas. Moreover, AT Parties should consider revisiting the concept of Sites of Special Tourist Interest restricting tourist activity to managed sites where regular monitoring can be undertaken and compliance with biosecurity provisions can be supervised.

2.3.2 DECONTAMINATION OF AN INDUSTRY: IAATO’S APPROACH TO BIOSECURITY

IAATO complements the ATS through a fractured set of linked procedures that must be complied with to be a member of the organisation.⁴⁶⁵ IAATO is important within the regulatory framework of Antarctic tourism as AT Parties rely heavily on the self-policing and enforcement procedures of the organisation.⁴⁶⁶ The mandatory Decontamination Guidelines identify awareness raising measures and cleaning procedures to attempt to reduce the risks of tourist activities introducing NNS.⁴⁶⁷ In addition, further procedures provide for notifying the nearest station after finding dead wildlife.⁴⁶⁸ The mandatory nature of the processes and comprehensive cleaning and awareness routines exceeds anything provided for by AT Parties and the hortatory standards prescribed by SCAR. IAATO also voluntarily extends the MARPOL guidelines for ballast water to the limits of the Convergence and the joint COMNAP-IAATO study demonstrates general compliance with ballast water

⁴⁶² For example: Hannah Point, which went from an average of 4815 visitors in the three years prior to Site Guidelines being adopted to 2358 visitors in the three years after being protected; Ibid.

⁴⁶³ See Table 2.4 above.

⁴⁶⁴ ATCM, *Site Guidelines for Visitors*, ATCM XXVIII Resolution 5 (2005), Preamble.

⁴⁶⁵ IAATO Bylaws, Article III (C); Article X, Section B.

⁴⁶⁶ Molenaar, above n 406, 31.

⁴⁶⁷ IAATO, ‘Boot and Clothing Decontamination: IAATO’s Recommended Guidelines’ in Update on Boot and Clothing Decontamination Guidelines and the Introduction and Detection of Diseases in Antarctic Wildlife: IAATO’s Perspective ATCM XXVIII IP97 (2005), Appendix A.

⁴⁶⁸ IAATO, Introduction and Detection of Diseases in Antarctic Wildlife: IAATO’s Perspective Appendix B, Ibid.

requirements.⁴⁶⁹ However, the system relies on updating disparate provisions as new risks are identified and although providing an inspection regime for new members,⁴⁷⁰ does little to ensure compliance in established operations other than requiring post visit reports and post season reports including information on “any unusual incidents affecting people or the environment.”⁴⁷¹

The risks associated with new and developing tourist activities are not addressed by IAATO.⁴⁷² IAATO submits an annual Programmatic EIA to the Environmental Protection Agency in place of a number of individual tourist operators.⁴⁷³ A strategic focus on limiting environmental impacts is appropriate but should not substitute specific EIAs for new activity in the region. As indicated above, not all AT Parties provide for EIA processes and some operators exist outside of the ATS.. In addition, while some non AT Party States do not require operators to provide EIA to visit the Antarctic, IAATO requires “equivalent required documentation” to be submitted to the IAATO secretariat.⁴⁷⁴ No particular guidance is provided as to the format of this documentation or what elements of the activity should be encompassed. While opposed to permanent structures as operators are committed to a “less than a minor or transitory impact” on the Antarctic environment,⁴⁷⁵ IAATO supports land based tourism.⁴⁷⁶ On the risks associated with land-based tourism, IAATO comments that “the spread of non-native biota and disease to inland sites is less likely because few life forms can withstand the harsh conditions,” although also identified that a land based operator had carried out cleaning procedures.⁴⁷⁷ Risk analysis needs to be carried out before any form of activity is ruled as “less likely” as the potential risks require a precautionary approach. Nevertheless, IAATO’s approach to biosecurity is an important aspect of the Antarctic biosecurity framework and the proactive approach of the industry should be incorporated into future biosecurity developments.

⁴⁶⁹ See Chapter 2, Section 2.3.4; COMNAP and IAATO, *Information Paper on the Use of Ballast Water* ATCM XXVIII IP 121 (2005).

⁴⁷⁰ IAATO Bylaws, Section B: “Organizers requesting Member status must if required carry an IAATO-approved Observer (unaffiliated to the Member being observed) during a voyage as agreed to by IAATO.”

⁴⁷¹ IAATO Bylaws, Article X, Section B; Bastmeijer, above n 71, 380-1; the required variables to be reported on are: “Site visited, latitude, longitude, time of visit, number of tourists and staff, and activities”: IAATO, *Post-Visit Report Form: Part 2 – Site Visit Record*, <http://www.iaato.org/docs/PVR_PC08.xls> Accessed 1/11/2009.

⁴⁷² ASOC, *Tourism and the duty for ATCP Action* ATCM XXX IP 85 (2007); K Bastmeijer and R Roura, ‘Regulating Antarctic Tourism and the Precautionary Principle,’ (2004) 98(4) *American Journal of International Law* 763, 779.

⁴⁷³ IAATO, above n 419, 2.

⁴⁷⁴ IAATO Bylaws, Article III, Section B.

⁴⁷⁵ IAATO, *IAATO Overview of Antarctic Tourism 2007-2008 Antarctic Season and Preliminary Estimates for 2008-2009 Antarctic Season* ATCM XXXI IP 84 (2008), 4; IAATO Bylaws, Article II(e).

⁴⁷⁶ IAATO, *Land-Based Tourism and the Development of Land-based Tourism Infrastructure in Antarctica: An IAATO Perspective* ATCM XXIX IP85 (2006), 2.

⁴⁷⁷ IAATO, above n 466, 1.

2.3.3. SUMMARY OF BIOSECURITY FOR ANTARCTIC TOURISTS

The regional approach to specific biosecurity threats posed by tourist activity is subject to the same limitation as the regulatory regime for scientific activity, a lack of strategy behind regulation. Although PEPAT's environmental planning principles apply to tourist activity, some of the measures, particularly the EIA process are not adequate for addressing the unique problems posed by the growing industry. Area specific regulation limits the intensity of tourist activity but does so without providing for compliance or addressing the more systematic problems of the tourist approach in the Antarctic area. The provision for the issue in IAATO, including the comprehensive and mandatory decontamination guidelines, wildlife watching guidelines and response measures, considerably decrease the risk of the industry introducing NNS. However, IAATO is not the most appropriate body to provide the principal biosecurity measures in the Antarctic. The involvement of the industry is essential in ensuring compliance with any regime and effecting adaptive management techniques, but a biosecurity regime must be strategically addressed by AT Parties. Although the IAATO Decontamination Guidelines address terrestrial movements and small boat fouling, nothing within either the ATS or IAATO addresses the considerable biosecurity threat posed by tourist vessels visiting a number of locations and potentially shifting marine species attached to ship surfaces.⁴⁷⁸ Rather than the negligence of IAATO and the ATS, this represents a general lack of understanding of marine vessel movements and the potential impacts of tourism on the Antarctic marine environment which should be a focus of future research efforts.⁴⁷⁹ The extent global instruments address these issues will be evaluated in Chapter 3.

2.4. VECTOR 3: FISHERIES

Fishing activity in Antarctica invokes three distinct categories of biosecurity threats, direct threats from legitimate activity, illegitimate activity and the indirect impact of fishing breaking down the natural barriers of ecosystems. There is insufficient data to analyze the specific threats posed by fishing vessels, particularly through bio fouling of ship surfaces and fishing equipment and NNS used as bait. New Zealand studies indicate the maintenance patterns of commercial fisheries vessels are not sufficient to reduce the risks of NNS introduction but no studies into the movements of fishing

⁴⁷⁸ Established as a particular risk of tourist activity in New Zealand; J Burrowes, Y Klaessens and D Appels, *Just Cruising? Environmental effects of cruise ships*, Report of the Parliamentary Commissioner for the Environment (2003).

⁴⁷⁹ Lynch, above n 403, 8.

vessels or viability of fouling organisms have established clear risks of introduction.⁴⁸⁰ Moreover, in contrast to the PEPAT EIA process, the conservation measures ('CM') providing for the consideration of environmental impacts before engaging in activity only identify a few specific environmental risks in relation to the harvesting activity. CCAMLR requires members to engage in harvesting activities consistent with the "...prevention of changes or minimisation of the risk of changes in the marine ecosystem which are not potentially reversible over two or three decades including...the effect of the introduction of alien species."⁴⁸¹ However the issue has not been addressed by CCAMLR and a review of the Commissions performance highlighted the provision as a gap in implementation.⁴⁸²

Legitimate fishing activity thus poses an uncertain threat of introducing NNS but a considerable amount of the activity in the Antarctic is carried out by IUU fishing vessels that are not even bound by the ecosystem based management regime of CCAMLR.⁴⁸³ Although no studies have demonstrated the fouling extent or ballast water practices of IUU vessels, extensive use of gillnets confirms the vessels do not conform with the CMs set by CCAMLR.⁴⁸⁴ The final area that will not be discussed in depth in this thesis is the indirect impact of fisheries on indigenous populations. Any fisheries activity interrupts local ecosystem processes and with the presence of a ship, provides an opportunity for invasive marine species to potentially fill any niches left behind. However, the purpose of this thesis is not to explore the legitimacy of fisheries activity in the Antarctic or explore the sustainability of the fishing efforts, although both factors have a significant impact on biosecurity threats. The AT explicitly preserves high seas freedoms, including the right to fish⁴⁸⁵ and AT Parties have expressly agreed that conservation of Antarctic marine living resources includes the "rational use" of the resource.⁴⁸⁶ This section will analyze the obligations and mechanisms available to CCAMLR members to regulate biosecurity threats arising from fisheries activity. In addition, the compliance measures used to limit IUU fishing vessels exposing the environment to unregulated biosecurity threats and

⁴⁸⁰ O Floerl and G J Inglis, 'Starting the invasion pathway: the interaction between source populations and human transport vectors' (2004) 7 *Biological Invasions* 589, 603.

⁴⁸¹ CCAMLR, Article II(3)(c).

⁴⁸² Review Panel of CCAMLR, *CCAMLR Performance Review Panel Report*, (2008); page 11 <<http://www.ccamlr.org/pu/E/00%20Prfrm%20Review%20for%20public%20webpage.pdf>> accessed 5 June 2009 ('CCAMLR Review'), [11].

⁴⁸³ A Brown, 'Some Current Issues Facing the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR)' in G. Triggs, and A. Riddell, *Antarctica: legal and environmental challenges for the future* (2007), 93.

⁴⁸⁴ CCAMLR, Report of the XXVIII CCAMLR Meeting (2009) [9.1].

⁴⁸⁵ AT, Article 6; it is long established custom that the right to fish is subject to certain limitations: UNCLOS, at Article 194, obliges members to take measures to prevent pollution of the marine environment, including measures to minimize pollution from vessels (Article 194 (3)(b)) and measures to protect rare or fragile ecosystems (Article 194 (5)).

⁴⁸⁶ CCAMLR, Article 2(2).

ensure legitimate fishing vessels implement the ecosystem based management regime will be briefly analysed.

The Joint SC-CAMLR and CEP workshop specifically addressed the potential duplication of environmental protection through the PEPAT and CCAMLR systems, recommending a more integrated approach.⁴⁸⁷ Any introduction of a fishing species for the purpose of mariculture or harvesting in the AT area should require a permit through Annex II of PEPAT, although this has not been addressed by AT or CCAMLR parties.⁴⁸⁸ The extent to which the planning principles of PEPAT complement fishing management is limited, although it has clear application where fisheries vessels are involved in non-fishing activities.⁴⁸⁹ All CCAMLR members are Parties to the AT and PEPAT⁴⁹⁰ but fishing activities are explicitly excluded from several significant tools of PEPAT.⁴⁹¹ The Final Act of PEPAT negotiations reserve the party's rights and obligations under CCAMLR and exempts fishing activities from the EIA process.⁴⁹² The designation of a marine ASPA or ASMA requires prior approval by CCAMLR⁴⁹³ and the liability annex, although leaving room open for CCAMLR to adopt the provisions, excludes fishing vessels from its ambit.⁴⁹⁴ However, Article 5 of PEPAT requires consultation and cooperation with Contracting Parties of the other instruments under the ATS to ensure the fulfillment of its objectives. CCAMLR members, even if not party to the treaty, are obliged to observe the measures adopted by the AT Parties "in fulfillment of their responsibility for the protection of the Antarctic environment."⁴⁹⁵ CCAMLR and its Scientific Committee must "cooperate with the AT Consultative Parties on matters falling within the competence of the latter"⁴⁹⁶ and must take into account any relevant measures or recommendations from the ATCM.⁴⁹⁷ The Joint Workshop between SC-CAMLR and the CEP recommended the CEP take the lead in addressing NNS

⁴⁸⁷ Joint CEP and SC-CAMLR Workshop, [3.4].

⁴⁸⁸ I Meliane and C Hewitt, *Gaps and Priorities on Marine Invasive Species*, IUCN Information Document (2005), 4; for more information, see Chapter 3, Section 4.2.

⁴⁸⁹ M Jacobsson, 'The Antarctic Treaty system: legal and environmental issues – future challenges for the Antarctic Treaty System' in G. Triggs, and A. Riddell, *Antarctica: legal and environmental challenges for the future* (2007), 2.

⁴⁹⁰ Of the 25 members of the Commission, only Namibia is not a Consultative Member of the AT. Of the 9 states who have acceded to CCAMLR without joining the commission, 4 are Consultative Members of the AT, 2 are non-Consultative members and 3 are not members of either (Mauritius, Vanuatu and the Cook Islands).

⁴⁹¹ A Herr, 'CCAMLR and the Environmental Protocol: Relationships and Interactions' in D Vidas (ed) *Implementing the Environmental Protocol Regime for the Antarctic* (2000), 279-280.

⁴⁹² ATCM, Final Act of the SATCM XI (1991), [7].

⁴⁹³ PEPAT, Annex 5, Article 6(2).

⁴⁹⁴ PEPAT, Annex VI, Article 1.

⁴⁹⁵ CCAMLR, Article V(2).

⁴⁹⁶ CCAMLR, Article XXIII(1).

⁴⁹⁷ CCAMLR, Article IX(5).

in the marine environment and develop a notification procedure for marine related measures to permit CCAMLR's input.⁴⁹⁸ The CEP addressing the generic issues with marine vectors avoids duplication but given CCAMLR's mandate, it is more appropriate for the fisheries organisation to address the specific issues with fisheries vessels and operations.

2.4.1 PREVENTING NNS THROUGH ECOSYSTEM BASED MANAGEMENT

The negotiation of CCAMLR sets an adequate foundation for biosecurity measures through establishing ecosystem based management, with express identification of the risks posed by NNS. Fear of the ecosystem effects of the unregulated harvest of krill prompted the negotiation of a new agreement for bringing marine resources under the ATS.⁴⁹⁹ To manage fisheries the Commission set up by CCAMLR is responsible for "compiling data on the status and changes in populations of Antarctic marine living resources including factors affecting their distribution, abundance and productivity"⁵⁰⁰ and formulating, adopting and revising conservation measures (CM).⁵⁰¹ CM are a more streamlined management tool than the measure, binding upon nations after 180 days except in the event of a state objecting.⁵⁰² Similar to the other main institutions of the ATS, membership to the decision making commission set up by CCAMLR is contingent on engaging in research and harvesting activities in the Southern Ocean.⁵⁰³ That proponents of the industry set the legal mechanisms for exploitation is not ideal and results in compromises for environmental protection.⁵⁰⁴ Certainly, CCAMLR has not elaborated the requirement to consider the potential introduction of NNS, although certain aspects of its management regime have relevance to the reduction of biosecurity threats from fishing.

⁴⁹⁸ Joint CEP and SC-CAMLR Workshop, [5.4-5.5].

⁴⁹⁹ ATCM, *Final Report of the ATCM VIII* (1975), [14]; A J Constable *et al*, 'Managing fisheries to conserve the marine ecosystem: practical implementation of the Convention on the Conservation of Antarctic Marine Living Resources' (2000) 57(3) *ICES Journal of Marine Science* 778, 787.

⁵⁰⁰ CCAMLR, Article IX(1)(b).

⁵⁰¹ CCAMLR, Article IX(1)(f).

⁵⁰² CCAMLR, Article IX(6); E N Sabourenkov and D G M Miller, 'The Management of Transboundary Stocks of Toothfish, *Dissostichus* spp, under the Convention on the Conservation of Antarctic Marine Living Resources,' in A. I. L. Payne, C. M. O'Brien and S. I. Rogers (eds.) *Management of Shared Fish Stocks* (2004), 68.

⁵⁰³ CCAMLR, Article VII(2)(b).

⁵⁰⁴ D G M Miller *et al*, 'Managing Antarctic Marine Living Resources: The CCAMLR Approach,' (2004) 19(3) *The International Journal of Marine and Coastal Law* 317, 319.

2.4.1.1 NNS IN THE NETS: PLANNING PROCESSES

Fisheries' activities are not subject to EIA but CCAMLR has developed other regulations that urge consideration of environmental impacts.⁵⁰⁵ CCAMLR requires the Commission to facilitate scientific research on the Antarctic marine ecosystem and engage in monitoring activity.⁵⁰⁶ The CCAMLR Ecosystem Monitoring Program (CEMP), established in 1985, aims to "detect and record significant changes in critical components of the ecosystem, [and] to serve as the basis for the conservation of Antarctic Marine Living Resources."⁵⁰⁷ It not only collects information about harvested species' abundance,⁵⁰⁸ but also biological information such as the age composition of harvested animals, the speed they grow, breeding patterns and natural mortality, and data on dependent species.⁵⁰⁹ Sites are now independently monitored and include extensive analysis of other variables, like environmental conditions and pollution, and the presence of NNS.⁵¹⁰ Moreover, the requirement for new and exploratory fisheries before full fisheries are permitted and the limitation of fishing to seasons, areas and total allowable catch leads to less exposure to NNS.

Aspects of the various Annexes of PEPAT find partial manifestation in CM 26-01, identified by the CCAMLR Review Panel as the main measure promoted by CCAMLR to avoid the introduction of NNS.⁵¹¹ In particular, the CM prohibits the movement of live poultry into the area south of 60 degrees latitude and requires the removal of any poultry remains.⁵¹² Garbage must be removed from the area and food wastes, offal and sewage must be macerated and not disposed within 12 miles of land or ice shelves or at a speed of less than 4 knots. In addition, the CCAMLR Review highlights the "need to be alert to discussions within the ATCM and the IMO on such issues as the control of ballast water discharge and the Polar Shipping Code, with a possible view to extending such provisions to

⁵⁰⁵ A D Hemmings, K N Scott and M Rogan-Finnemore, 'Broadening the duty in relation to Environmental Impact Assessment across the legal instruments applying in Antarctica' (Paper presented at 15th Annual Conference of the Australian and New Zealand Society of International Law 'Restoring the Rule of Law in International Affairs', Canberra, Australia, 28-30 Jun 2007), 14-17.

A detailed explanation of CCAMLR's approach to Fisheries Management is available on the CCAMLR website: <http://www.ccamlr.org/pu/e/e_pubs/am/toc.htm>

⁵⁰⁶ CCAMLR, Article IX(1)(a).

⁵⁰⁷ CCAMLR, Report of the IV SC-CCAMLR Meeting (1985) [7.2].

⁵⁰⁸ Through fish catch data, as well as acoustic and trawl surveys.

⁵⁰⁹ CCAMLR, *CCAMLR's Management of the Antarctic* (2001) <http://www.ccamlr.org/pu/e/e_pubs/am/man-ant/synopsis_final_all.pdf>, accessed 10 April 2010; Joint CEP and SC-CAMLR Workshop, above n 399, 8.

⁵¹⁰ *Ibid*, 8.11.

⁵¹¹ CCAMLR Review, above n 481, 11.

⁵¹² General environmental protection during fishing, CM 26-01 (2009), para. 5(iv) and 6.

fishing vessels.”⁵¹³ Not all measures are implemented by fishing vessels and very little information is available on the non-fishing activity of fishing vessels in the Southern Ocean.⁵¹⁴

2.4.1.2 LINES IN THE WATER: PROTECTING AREAS FROM FISHERIES THREATS

The same rationale for limiting access to terrestrial sites applies to marine sites, certain sensitive ecosystems require a precautionary approach to biosecurity and high use areas should be monitored more frequently. CCAMLR provides for three forms of area protection: CEMP sites, marine protected areas (MPAs) and limiting bottom trawling in vulnerable marine ecosystems.⁵¹⁵ All are useful for biosecurity framework. Initially, the only provision for area specific protection in CCAMLR was part of the CEMP as all provide for the limitation of interaction with parts of the marine environment.⁵¹⁶ However, in order to extend the protection to provide for conservation of biological protection under CCAMLR and PEPAT, the SC-CAMLR and CEP coordinate the designation of MPAs in the Southern Ocean. MPAs are not a single management tool but a catalyst for the employment of a range of tools aimed at facilitating conservation of marine biodiversity.⁵¹⁷ Any AT Party can request the approval of CCAMLR for the designation of a marine protected area. CCAMLR members will agree on a “case-by-case basis”, in the context of a representative network of MPAs based on a bioregionalisation process, whether to approve the site.⁵¹⁸ In practice, the conflict between AT Parties promoting “rational use” and conservation of Antarctic marine living resources has compromised the ecological values of the designation.⁵¹⁹ In addition, the United Nations encourages active protection for seamounts and hydrothermal vents, although has not expressly addressed the potential risks of NNS introduction.⁵²⁰ CCAMLR provides for the protection of vulnerable benthic habitats from bottom trawling,⁵²¹ although has not addressed the potential introduction of NNS in its

⁵¹³ CCAMLR Review, above n 481, 14.

⁵¹⁴ B K Sovacool and K E Siman-Sovacool, ‘Creating Legal Teeth for Toothfish: Using the Market to Protect Fish Stocks in Antarctica,’ (2007) 20(1) *Journal of Environmental Law* 15, 17.

⁵¹⁵ *Report of the Workshop on Vulnerable Marine Ecosystems*, in Annex 4/Report of SC-CCAMLR XXVIII Meeting (2009) [5.14-5.37].

⁵¹⁶ See Table 2.5 below.

⁵¹⁷ CCAMLR, *Report of XXVIII CCAMLR Meeting* (2008), [7.16].

⁵¹⁸ CCAMLR, *Report of XXVIII CCAMLR Meeting* (2009), [7.1-7.19].

⁵¹⁹ CCAMLR, *Report of the XXVIII CCAMLR Meeting* (2009), [7.17] (Comments of ASOC).

⁵²⁰ United Nations General Assembly Resolution 61/105 (2006), OP83.

⁵²¹ CCAMLR, *Bottom Fishing in the Convention Area* CM 22-06 (2009); CCAMLR, *Interim measure for bottom fishing activities subject to Conservation Measure 22-06 encountering potential marine ecosystems in the Convention Area* CM 22-07 (2009); CCAMLR, *Prohibition on fishing for Dissostichus spp. In depths shallower than 500 m in exploratory fisheries* CM 22-08 (2009); See SC-CAMLR, *Report of XXVII SC-CAMLR Meeting* (2008) [4.207-4.284].

deliberations.⁵²² Establishing mechanisms to protect specific areas in the high seas is a global challenge that is addressed in Chapter 3.

TABLE 2.5: MECHANISMS OF PROTECTING AREAS IN THE MARINE ENVIRONMENT UNDER CCAMLR AND ATS

Area Type	CEMP Sites ⁵²³	MPAs ⁵²⁴	Vulnerable Marine Ecosystems ⁵²⁵
Reasons for Designation	Areas contribution to CEMP Monitoring stock levels and ecosystem effects. Protect scientific investigations	Representativeness Protection of areas vulnerable to human activities Science Protection of ecosystem function	Habitats and taxonomical groups vulnerability to bottom fishing gear
Methods to Protect	ASPAs designation Restricts access except for purposes authorized in management plan	ASPAs designation Conservation Zones Fisheries Closed Areas	Restrictions on bottom trawling

The utility of the protected area processes to biosecurity is the extent they limit interaction with the areas and provide for more precautionary biosecurity conditions on entry. CEMP sites and MPAs both can utilize ASPA processes, which allows for requiring a permit to entry and extension of protection to non-fishing AT Parties.⁵²⁶ Moreover, entry to CEMP sites is prohibited for purposes other than those authorized the management plan.⁵²⁷ Although consideration of limiting ballast discharge is not explicitly included in the provision, the limitation of access restricts exposure to NNS.⁵²⁸ Despite the significant consideration of MPAs in SC-CAMLR, there has been no attempt to incorporate the consideration of biosecurity into the discussion of MPAs.⁵²⁹ The only MPA sets aside the South Orkney Island southern shelf to contribute towards the “conservation of marine

⁵²² See SC-CAMLR, *Report of the Workshop on Vulnerable Marine Ecosystems*, Report of the XXVIII SC-CAMLR Meeting (2009), Annex 10; SC-CAMLR, *Report of the Working Group on Ecosystem Monitoring and Management* Report of the CCAMLR XXVIII (2009), Annex 4 [5.1-5.14].

⁵²³ CCAMLR, *Procedure for according protection to CEMP sites* CM 91-01 (2004).

⁵²⁴ SC-CAMLR, *Report of the CCAMLR Workshop on Marine Protected Areas* SC-CAMLR Report XXIV Annex 7 (2005), 614, Table 1.

⁵²⁵ SC-CAMLR, *Report of the CCAMLR Workshop on Vulnerable Marine Ecosystems* SC-CAMLR Report XXVIII Annex 7/ (2009), 514.

⁵²⁶ CM 91-01, above n 523.

⁵²⁷ CM 91-01 [10]; L Goldsworthy and A D Hemmings, ‘The Antarctic Protected Areas Approach’ in S Hart (ed.) *Shared Resources: Issues of Governance*, (2008) IUCN Environmental Law and Policy Paper No.72, 123.

⁵²⁸ CM 91-01, above n 523.

⁵²⁹ CCAMLR, *Report of the XXVIII CCAMLR Meeting* (2009), Item 7; CCAMLR, *Report of the XXVII CCAMLR Meeting* (2008), Item 7; CCAMLR, *Report of the XXVI CCAMLR Meeting* (2007), Item 6; CCAMLR, *Report of the XXV CCAMLR Meeting* (2006), Item 6.

biodiversity in Subarea 48.2".⁵³⁰ The CM prohibits fishing activities,⁵³¹ discharges, or dumping of any form of waste in the area.⁵³² Moreover, fishing vessels planning travel through the area are "encouraged" to inform CCAMLR of their intended transit route, permitting comprehensive monitoring. By restricting fishing activity and discharges, the MPA designation reduces the risk of introducing NNS into the area, although CCAMLR members have clearly indicated the approach is not a template for future MPAs.⁵³³ Reducing impacts to benthic communities does not always require rerouting vessel traffic as limiting fishing activity can be sufficient to limit the interaction with the environment and potential for NNS introduction. The practical implementation of these provisions depends on whether under the international law of the sea such protection is enforceable, which will be discussed in Chapter 3.

2.4.2 OBSERVING AND INSPECTING: FISHING COMPLIANCE

CCAMLR provides a comprehensive system of observation and inspection to verify compliance with the measures of the Convention.⁵³⁴ The SC-CAMLR has highlighted the importance of taking into account the impact of conservation measures that target biosecurity threats when developing systems to evaluate compliance measures.⁵³⁵ Since 1989, CCAMLR has allowed inspectors of one nation to board and inspect others within the Convention Area⁵³⁶. Two inspection manuals and a reporting template are available to provide inspectors with all the relevant information necessary to undertake their duties.⁵³⁷ However, as there are limited primary biosecurity responsibilities, there is only limited potential for compliance. There are no requirements to inspect ship surfaces or equipment for fouling, ballast water or potentially invasive bait,⁵³⁸ but waste disposal including poultry products, organic waste and inorganic waste will be examined to ensure compliance with CM

⁵³⁰ CCAMLR, Protection of the South Orkney Islands south shelf CM 91-03 (2009), [1].

⁵³¹ Apart from those done by scientific fishing research activities agreed by the Commission for monitoring or other purposes: *Ibid* [1].

⁵³² *Ibid* [3].

⁵³³ CCAMLR, Report of the XXVIII CCAMLR Meeting (2009), [7.19].

⁵³⁴ CCAMLR, Article XXIV.

⁵³⁵ CCAMLR, 'Report of the Workshop for the Development of a Compliance Evaluation Procedure' in *Report of the XXVIII CCAMLR Meeting*, Annex 6, 22.

⁵³⁶ Vicuña, above n 39, 51-53.

⁵³⁷ CCAMLR, *CCAMLR Inspection Manual* (2009) <http://www.ccamlr.org/pu/e/e_pubs/e-inspectors.pdf> 10 January 2000, ('CCAMLR Inspection Manual') v; CCAMLR, *Scientific Observers Manual* (2009) <http://www.ccamlr.org/pu/e/e_pubs/om/obsman.pdf> at 10 January 2010 ('CCAMLR Scientific Observers Manual'), 10; CCAMLR, *CCAMLR Scientific Observer Cruise Report* (2010) <<http://www.ccamlr.org/pu/E/sc/obs/current-forms/e-cr-rep.doc>> at 12 January 2010 (CCAMLR Observer Template).

⁵³⁸ The species of bait used, as well as baiting efficiency and bait ratio must be identified. CCAMLR Observer Template [4.1].

26-01.⁵³⁹ Members are also encouraged to record and report any IUU fishing vessels and CCAMLR coordinates diplomatic action to attempt to encourage compliance.⁵⁴⁰ Several other innovative mechanisms promoting better compliance with CMs have been developed by CCAMLR. A specific policy is designed to enhance cooperation between CCAMLR and non-CCAMLR members and involves direct interactions between the Chairman of CCAMLR and states that authorise IUU fishing in the area.⁵⁴¹ The Vessel Monitoring Scheme that requires non-krill harvesting vessels to install satellite-tracking devices⁵⁴² on board fishing vessels could be utilized to ensure MPAs and CEMP areas are avoided. The Catch Documentation System ('CDS') creates a paper trail to enable CCAMLR to monitor the flow of toothfish in markets,⁵⁴³ and incorporating contents of ballast water plans could promote compliance. However, the occurrence of mislabeling, falsifying, reusing and tampering of catch documents has impeded the CDS.⁵⁴⁴

In the overlap between coastal states and the higher latitude CCAMLR subareas, coastal states in the sub-Antarctic have some scope to supervise and enforce measures on non-party vessels. The correlation between the decline in the number of sightings of IUU fishing vessels in the CCAMLR area and increase in fines in sub-Antarctic EEZ fisheries is evidence of the effectiveness of this approach.⁵⁴⁵ However, the most appropriate approach focuses on the port of entry. CCAMLR Member Port States must inspect all vessels licensed by CCAMLR members and to prohibit landings of IUU catches.⁵⁴⁶ The Coalition of Legal Toothfish Operators ('COLTO') and ASOC also urged the tightening of port state controls to constrict the capacity of IUU vessels to access markets.⁵⁴⁷ Developments in the international law of fisheries have developed port state capacity considerably and provide the mechanics for more effective enforcement of CMs.⁵⁴⁸ However, CCAMLR can better

⁵³⁹ CCAMLR Inspection Manual, [vii]; Scientific Observers Manual, [10].

⁵⁴⁰ CCAMLR, Combating illegal, unreported and unregulated fishing in the Convention Area by the flag vessels of non-Contracting Parties, CCAMLR Resolution 25/XXV.

⁵⁴¹ Ibid.

⁵⁴² CCAMLR, Automated satellite-linked Vessel Monitoring Systems CM 10-04 (2007).

⁵⁴³ CCAMLR, Catch Documentation Scheme for *Dissostichus* spp. CM 10-05 (2008); also supported by the AT; ATCM, Support for the Catch Documentation Scheme; ATCM XXIV Resolution 2 (2001), Support for the Catch Documentation Scheme SATCM XII Resolution 2 (2000).

⁵⁴⁴ Miller, above n 504, 319.

⁵⁴⁵ D J Agnew, 'The illegal and unregulated fishery for toothfish in the Southern Ocean and the CCAMLR catch documentation scheme' (2000) 24 *Marine Policy* 366; *The Monte Confurco (Seychelles v France)* (2000), International Tribunal on the Law of the Sea, Case No.6, Dissenting Judgment of Judge Anderson, [3].

⁵⁴⁶ CCAMLR, Port inspections of vessels carrying toothfish CM 10-03 (2009).

⁵⁴⁷ ASOC, The use of Port State measures to improve fisheries compliance at the international level: Issues and instruments – the CCAMLR case CCAMLR XXV/BG/29 (2006); Report of XXV CCAMLR Meeting (2006) [16.9] (ASOC), [16.14] (COLTO).

⁵⁴⁸ See below, Chapter 3, Section 4.1.

address vessels that breach CMs and cut down on the biosecurity threats from legitimate fisheries, once effective biosecurity provision is enacted for all vessels in the AT area.

2.4.3 FISHING SUMMARY

The fishing industry poses considerable biosecurity threats to the Antarctic environment. Compared to the comprehensive approach of IAATO, industry organisations in CCAMLR have done nothing to address the risks posed by NNS. Moreover, AT Parties have taken a conservative approach to the ecosystems approach to fisheries management and have not examined the specific biosecurity threats risks posed by fisheries activity. The CCAMLR directly addresses these concerns and yet few practical steps have been taken at the institutional level. Parties have committed to developing a bioregional framework of MPAs and a comprehensive set of MPAs and CM 26-01 applies some of the relevant waste management mechanisms of PEPAT. However, the lack of consideration in CCAMLR is evident in the failure to address bio fouling or alien bait concerns, only addressing ballast water after prompting by the CEP. The CEP should drive the consideration of the generic ship based aspects as identified by the joint SC-CAMLR and CEP workshop, although CCAMLR and SC-CAMLR needs to prioritize assessing and managing risks specific to fisheries.

2.5. CONCLUSION

The ATS has adopted a fractured and limited framework for managing the biosecurity threats to the Antarctic environment posed by human activity. Developments in the CEP confirm AT Parties are committed to providing a biosecurity regime with preventative, surveillance and response measures. However, the institutional and legal mechanics supporting implementation are not adequate for a comprehensive biosecurity framework. Taken as a whole, the ATS provides a reasonably robust requirement to consider environmental impacts in planning activity. The planning principles under Article 3 of PEPAT and EIA process imply some consideration of biosecurity in the planning of activities, although gaps in implementation remain significant and not very well understood. Moreover, the protection of specific areas, regulation of waste and marine pollution and provision for contingency and liability have some relevance to a biosecurity framework but are not strategically aligned with the prevention of biosecurity threats. IAATO's Decontamination Procedures and Mandatory Compliance Regime complement PEPAT's framework. However, some CCAMLR members have detracted from the protection offered by PEPAT, especially in the attempts to form effective bioregional protection for marine areas. The threats of an NNS invasion are rising and a strategic focus, with tools that are adapted to adequately address biosecurity threats, is

necessary. Few tools adequately address the risks associated with biosecurity and those that do are not necessary implemented consistently across AT Parties. The main route of compliance is the diligence of other States in considering the EIA, ASPA and ASMA management plans, national and inspection reports submitted to the CEP and ASPA. Without some form of consistency across reports and integration with domestic legislative implementing provisions, a biosecurity framework cannot be supervised or enforced adequately. A comprehensive understanding of the issue must take into account the instruments outside of the ATS that apply to the introduction of NNS in the AT Area and domestic implementation of biosecurity measures. These issues will be considered in the next two chapters of the thesis.

3

APPLYING GLOBAL BIOSECURITY TO THE ANTARCTIC AREA

“...Antarctic Treaty parties have actively sought to keep Antarctic affairs off international agendas of non-ATS fora...[and] there are overlaps, and the potential certainly does exist for engagement among the legal regimes that may not be in harmony with what each is attempting to achieve.”¹

“We have entered an era...in which international law subserves not only the interests of individual States but looks beyond them and their parochial concerns to the greater interest of humanity and planetary welfare...International environmental law will need to proceed beyond weighing...rights and obligations...within a closed compartment of State self interest, unrelated to the global concerns of humanity as a whole.”²

3.1. INTRODUCTION

Chapter Two of this thesis explains the limitations of the biosecurity framework set out by the ATS. Despite implying a precautionary approach to the unintentional introduction of NNS, PEPAT does not provide States with the tools to address the issue, or mechanisms to ensure that non-Parties comply with the few relevant measures. Only 46 of the 196 UN Members are AT Parties, and almost half of all tourist and fishing activity in the Antarctic is conducted by operators flagged to States that are not AT Parties.³ As the rule of *pacta tertiis* excludes applying any biosecurity measures under the ATS to

¹ D R Rothwell, ‘Relationship between the Environmental Protocol and UNEP Instruments’ in D Vidas, *Implementing the Environmental Protection Regime for the Antarctic* (2000), 241.

² *Case Concerning the Gabčíkovo-Nagymaros Project (Hungary v Slovakia)* [1997] International Court of Justice Reports 7, separate opinion of Vice-President Weeramentry, aC(c).

³ See P J Beck, ‘Twenty years on: the UN and the ‘Question of Antarctica’ 1983-2003’ (2004) 40(3) *Polar Record* 205; see Appendix 8: Treaty Matrix.

third parties,⁴ a significant proportion of biosecurity risk cannot be addressed directly by AT Parties. However, the ATS does not exist in isolation; a number of instruments that directly and indirectly address the control of NNS have applicability in the Antarctic area. Although more than 50 international and regional instruments address the issue of NNS,⁵ the shortcomings of the international biosecurity regime are well established.⁶ However, many instruments with biosecurity measures applicable to the terrestrial and marine environment have the potential to complement the measures of the ATS. Moreover, the norm creating character of the more global conventions can to some extent be inherited by the ATS, where there is sufficient mutual connection between the regimes.⁷

AT Parties have traditionally sought to avoid the application of institutions and legal regimes in the AT area.⁸ The presence of disputed territorial claims distinguishes the Antarctic from other commons and transboundary areas complicating the application of international regimes.⁹ The texts of the ATS instruments do make minimal but significant reference to external regimes. The AT places itself within the context of the “purposes and principles embodied in the Charter of the UN,” as well as encouraging interaction with specialised UN agencies.¹⁰ In contrast, PEPAT was negotiated in the context of a number of globally applicable conventions under the UN Environmental Program (‘UNEP’), yet only addresses interaction with other international instruments in force within the ATS.¹¹ The CBD applies to Members’ activity in the Antarctic¹² and expressly provides that Parties should “[prevent] the introduction of, control or eradicate” NNS where they “threaten ecosystems, habitats or species,”¹³ arguably requiring a more precautionary approach to NNS than PEPAT.¹⁴

⁴ See above, *Chapter 2, Section 2.1.1.1*.

⁵ C Shine, N Williams and G Gündling, *A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species*, IUCN Environmental Policy and Law Paper No. 20 (2000), 32-3.

⁶ S Riley, ‘Invasive Alien Species and the Protection of Biodiversity: the Role of Quarantine Laws in Resolving Inadequacies in the International Legal Regime,’ (2005) 17 *Journal of International Law* 3, 334-337; L Glowka and C de Klemm, ‘International Instrument: Processes and Non-indigenous Species Introduction – Is a protocol Necessary?’ (1999) 26(6) *Environmental Policy and Law*.

⁷ P Vigni, ‘The Interrelation between the Antarctic Treaty System and the Other Relevant Conventions Applicable to the Antarctic Area’ in J A Frowein and R Wolfrum (eds.) *Max Planck Yearbook of International Law* (2000), 541-542,

⁸ D R Rothwell, ‘UNEP and the Antarctic Treaty System,’ (1999) 29(1) *Environmental Policy and Law* 17, 18.

⁹ I Zovko, ‘Vessel-sourced pollution in the Southern Ocean: benefits and shortcomings of regional regulation’ in G Triggs, and A Riddell, *Antarctica: legal and environmental challenges for the future* (2007), 203.

¹⁰ AT, Article III(2), X.

¹¹ PEPAT, Article 4(2); Rothwell, above n 2, 233.

¹² CBD, Article 4(b).

¹³ CBD, Article 8(h).

Although negotiated after PEPAT, Parties have failed to integrate the global biosecurity protection found in the CBD into the general provisions of PEPAT.

A number of factors contribute to the greater acceptance of external regimes in the marine rather than the terrestrial environment. Given the uncertainty over territorial jurisdiction in the Antarctic area and putting aside the position of claimant AT Parties, the Southern Ocean is effectively a high seas regime under the ambit of Part VII of UNCLOS.¹⁵ The AT explicitly reserves the customary high seas freedoms¹⁶ and PEPAT invokes the vessel sourced pollution discharge restrictions of MARPOL 73/78 in Annex IV. The IMO, a functional organisation of the UN responsible for creating standards for marine environmental protection, is playing an increasingly important role in regulating shipping activity in the Antarctic area.¹⁷ The IMO first established the Antarctic Treaty Area as a special area on AT Parties request under Annexes I, II and V of MARPOL 73/78 after the negotiation of the PEPAT and affirmed specific Antarctic Ballast Water Management Guidelines in 2007.¹⁸ The IMO has advantages over the ATS with technical expertise in shipping and application to all IMO Member States.¹⁹ AT Parties have increasingly acknowledged the need for mandatory requirements for ships in the Antarctic area and identified the IMO as the most appropriate body to provide such requirements.²⁰ The Special Area provisions are limited to the ambit of the AT area, as opposed to the Circumference found in CCAMLR but AT Parties have asked the views of CCAMLR in requesting the IMO to extend its Antarctic Special Area provisions to the limits of the Circumference to better protect the Antarctic environment.²¹

This chapter evaluates the extent to which other international instruments complement biosecurity measures under the ATS. In addition, the law of the sea relevant to biosecurity is analysed in the

¹⁴ Rothwell, above n 2, 235.

¹⁵ T Scovazzi, 'Towards Guidelines for Antarctic Shipping: A Basis for Cooperation between the Antarctic Consultative Parties and the IMO,' in D Vidas, *Implementing the Environmental Protection Regime for the Antarctic* (2000), 256-8.

¹⁶ AT, Article VI.

¹⁷ Scovazzi, above n 16, 258.

¹⁸ ATCM, *Ballast Water Exchange – Referral to IMO ATCM XXIX Decision 2* (2006); MEPC, *Guidelines for Ballast Water Exchange in the Antarctic Treaty Area* Resolution MEPC.163(56) (2007).

¹⁹ Ibid.

²⁰ Compare the ATME, *Guidelines for Antarctic Shipping and Related Activities 17-19 April 2000*, (2000) recommending guidelines in the form of a non-mandatory handbook (Recommendation 1) with ATCM, *Shipping Code* ATCM XXXII Resolution 8 (2009): "expressing the desire" of AT Parties that the IMO commences work on mandatory requirements for ships operating in the Antarctic area; see also United Kingdom, *Polar Shipping Code* ATCM XXIII WP 40 (1999).

²¹ ATCM, *Enhancement of Environmental Protection up to the Antarctic Convergence*, ATCM XXXII Resolution 1 (2009).

context of the Antarctic area as well as the potential for either regime to apply to the specific biosecurity threats from non-Party tourist and fishing activity.

3.2. NATIONAL ANTARCTIC PROGRAMS AND INTERNATIONAL BIOSECURITY

The nature of biosecurity threats arising from scientific activity in the Antarctic engages two main sources of law outside the ATS. International biodiversity law provides overarching duties on States that apply to all activities under their control. In addition, most States that have developed Antarctic biosecurity policy have done so in collaboration with domestic biosecurity experts who are responsible for implementing international policy.²² The extent the relevant biosecurity conventions complement the relevant ATS provisions have a direct bearing on the obligations of AT Parties in the Antarctic area. Moreover, scientific activity in the Antarctic area relies on support from aeroplanes and ships ferrying cargo and personnel. The law of the sea provides for the mitigation of some risks, although significant gaps remain in the provision and implementation of marine biosecurity.

3.2.1 BIOSECURITY IN THE INTERNATIONAL CONSERVATION OF BIODIVERSITY

There are a number of conventions that address the threat NNS pose to biosecurity.²³ Most, however, focus on the potential economic consequences of NNS introduction and do not promote application outside domestic territory.²⁴ In contrast, the CBD provides a global, binding but qualified²⁵ obligation for States to address biosecurity, arguably beyond the limited formulation found in PEPAT.²⁶ Article 8(h) requires States to take preventative and response action whether addressing the intentional or unintentional introduction and explicitly provides for preventative and

²² See for example: Australia, *Australian Antarctic Quarantine Practises*, ATCM XXVII IP 71(2004), 1.

²³ A full list of relevant provisions can be found in Shine, above n 5, 87-114.

²⁴ A list of all the Conventions with potential application to the Antarctic outside the ATS can be found in B Mansfield and N Gilbert, 'Availability and Applicability of Legal Tools for Managing [NNS]', in M Rogan-Finnemore (ed), *Non-Native Species in the Antarctic Proceedings* (2008), 159-163.

²⁵ The CBD qualifies a number of provisions including Article 9 with the proviso that parties should act "as far as possible and as appropriate," a symptom of a number of compromises made in the negotiation of the instrument that may be responsible for the limited proportion of States implementing the substantive aspects of the agreement. D M McGraw, 'The CBD – Key Characteristics and Implications for Implementation,' (2002) 11 *Review of European Community and International Environmental Law* 1, 17.

²⁶ CBD, Article 8(h).

response measures across all biological taxa and ecosystems.²⁷ However, applying this provision to AT Party activity in the Antarctic area depends on the measures being consistent with or complementary to ATS provisions.²⁸ Conflict between treaty regimes produces legal uncertainty that could result in a breakdown of the consensus required for the ATS to operate effectively.²⁹ The VCLT provides that a later treaty will only prevail if Parties intend the treaty to prevail or the provisions of the later treaty are “so far incompatible” with the earlier treaty, the two treaties cannot be applied at the same time.³⁰ Moreover, if a treaty identifies possible overlap and indicates it is to be compatible with that treaty, the earlier treaty prevails.³¹ The CBD is broadly accepted by the international community, with 193 Parties, including most known Antarctic authorizing States who have not signed the AT.³² All but one Consultative Party to the AT are parties to the CBD, and the general acceptance of the conservation aspects of the CBD is evidence that it has developed into customary international law.³³ However, the potential impact of the CBD on intellectual property rights over access and benefit-sharing of genetic resources has caused considerable controversy that has been invoked in the ATS.³⁴ Consequentially, the CBD’s relationship with PEPAT remains unclear.³⁵

²⁷ CBD, Article 2 defines “ecosystem” as “a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit”; “habitat” as “the place or type of site where an organism or population naturally occurs”.

²⁸ Rothwell, above n 2, 230.

²⁹ Ibid, 231; G Binder, ‘The Dialectic of Duplicity: Treaty Conflict and Political Contradiction’, (1985) 34(2) *Buffalo Law Review* 329, 340.

³⁰ VCLT, Article 59.

³¹ VCLT, Article 30.

³² See *Appendix 8: Antarctic Actors Treaty Matrix*.

³³ The one non-party, the United States domestic policies reflect CBD Principles; United States, *Executive Order Number 13112 on Invasive Alien Species* pronounced by President Clinton, (1999); A E Segarra and S R Fletcher, ‘Biosafety Protocol for Genetically Modified Organisms: Overview,’ S Elderidge (ed.), *Food Biotechnology: Current Issues and Perspectives* (2003), 95-96; Rothwell, above n 2, 231.

³⁴ CBD articles on technology transfer (CBD, Article 16) and distribution of biotechnology (CBD, Article 19); K T Kate and S A Laird, *The Commercial Use of Biodiversity: Access to Genetic Resources and Benefit Sharing* (1999); S Johnston, *The Relationship between an International Regime on Access and Benefit Sharing and the ATS and UNCLOS*, UNEP/CBD/WG-ABS/INF/3/Part 3 (2009); M Rogan-Finnemore, *The Legal Implications of Bioprospecting in the Antarctic*, (LLM, University of Canterbury, 2005), 92.

³⁵ P Sands, *Principles of International Environmental Law* (2003), 523; Compare a withdrawn ATCM working paper by SCAR commenting that “it would now appear that the Antarctic is now the only part of the world, excluding the High Seas, to which the CBD does not apply.” SCAR, *Convention on Biological Diversity for ATCM – Antarctic biodiversity*, XXV ATCM WP 24 [withdrawn] (2002) with the acceptance of CBD application found in two ATCM working papers submitted in the mid 1990s: United Kingdom, *The Relationship between the Protocol on Environmental Protection to the Antarctic Treaty and Other International Agreements of a Global or Regional Scope*, ATCM XX WP 10 (1996); and Chile, *Relation between the Protocol on Environmental Protection to the Antarctic Treaty and Other International Agreements of A Global and Regional Scope*, ATCM XIX WP 20 (1995).

The CBD expressly prioritise existing international agreements “except where the exercise of those rights and obligations would cause a serious damage or threat to biological diversity.”³⁶ The broad definition of biological diversity found in the CBD arguably sets a low standard for the engagement of this provision, particularly in the sensitive Antarctic continent where regular station activities could significantly impact species variability.³⁷ Nevertheless, CBD Parties have clearly indicated the precedence of regional biodiversity instruments by prioritising the application of PEPAT over the CBD.³⁸

In the context of the broad ecosystem-focus of both the CBD and PEPAT, the instruments appear to complement each other, even with the minimal interaction between regimes.³⁹ The “natural reserve” instituted by PEPAT fits within the CBD requirement to “establish a system of protected areas or areas where special measures need to be taken to conserve biodiversity”⁴⁰; and under PEPAT, Parties must provide for activities not having detrimental effects on species or populations of fauna and flora, evoking the “suite of measures” to conserve biodiversity in-situ under Article 8 of the CBD.⁴¹ The close proximity of the two framework conventions indicates that Article 8(h) of the CBD does not conflict with PEPAT’s biosecurity provisions under Annex II, but elaborates the broad environmental protection promoted under Article 3 of PEPAT. That is, although Annex II of PEPAT does not explicitly lay out a broad duty to prevent the introduction of NNS, Article 8(h) of the CBD confirms and codifies the implicit duty under Article 3 of PEPAT. Certainly some AT Parties have interpreted PEPAT and the CBD as interconnected regimes.⁴² In addition, many of the more

³⁶ CBD, Article 22.

³⁷ CBD, Article 2, “...the variability among living organisms from all sources, including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems.” McGraw, above n 26, 18.

³⁸ Ibid, 17.

³⁹ The CBD Council of Parties (‘COP’) does expressly encourage AT Parties to “raise” the issue of invasive alien species at the ATCM and supports the development of measures and controls under PEPAT to address the threats associated with NNS in the AT area, especially the issue of marine bio fouling. CBD COP, *Alien species that threaten ecosystems, habitats or species (Article 8 (h)): further consideration of gaps and inconsistencies in the international regulatory framework* Decision VIII/27 (2006), 33, 65-66.

⁴⁰ Rothwell, above n 2, 233; CBD, Article 8(a)-(e), See section 3.2.1.2.

⁴¹ Ibid, 234; Shine, above n 5, 14; in-situ conservation is defined as “the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings,” Article 2, CBD.

⁴² Japan and Germany refer to Antarctic EIA processes in their 3rd National Reports under CBD, Article 14; Japan, *Third National Report on the Implementation of the CBD* (2005), 96; Germany, *Third National Report on the Implementation of the CBD* (2005), 72, 73, 134, 207 [Japan refers to Annex II in relation to “bilateral, regional and multilateral agreements on activities likely to significantly affect biological diversity outside your country’s jurisdiction”; Germany discusses the

substantive provisions found in Article 3 and Annex III manifest the obligation under Article 5 of the CBD to “cooperate with other Contracting Parties... where appropriate, through competent international organisations, in respect of areas beyond national jurisdiction... for the conservation and sustainable use of biological diversity.”⁴³

3.2.1.1 COMPLEMENTARY TOOLS: STRATEGIC ASSESSMENT, GUIDING PRINCIPLES AND REPORTING

This interpretation has limited practical implications for scientific operations in Antarctica. The CBD is a framework convention⁴⁴ and as such, does not provide any substantive binding obligations on members beyond a qualified obligation to implement a framework of tools to conserve biodiversity and the potential to elaborate obligations through subsidiary instruments.⁴⁵ Many of the provisions duplicate PEPAT’s mechanisms but some go beyond the tools available to address biosecurity in the ATS. In particular, the CBD provides for the integration of biodiversity issues into strategic planning processes⁴⁶ and for the environmental assessment of plans, policies and programs that might have a significant impact on biodiversity.⁴⁷ Impact assessment has been addressed as a cross-cutting issue by the CBD Council of Parties, and specific guidance has been developed for integrating strategic impact assessment into domestic processes that addresses the risks from biodiversity.⁴⁸ Every AT Party has submitted a national biodiversity strategy and all make reference to the implementation of Article 8(h). Parties are not obliged to apply the measures to their Antarctic activities due to the qualifiers in the text of the CBD and potential inconsistency with the requirement under Annex I of PEPAT. However, the established benefits of strategic impact assessment and planning for NAP and tourist activity suggest that the provision complements the environmental principles and assessment

application of the Antarctic Treaty in detail in a number of sections, including Cooperation, Operations and Environmental Assessment].

⁴³ This interpretation is supported by the Antarctic Treaty being listed as a regional agreement under the CBD website: <<http://www.cbd.int/invasive/done.shtml>>; CBD Executive Secretary, *Indepth Review of Invasive Alien Species* UNEP/CBD/COP/9/INF/32 (2008) (‘CBD Review’), [37].

⁴⁴ “a document establishing, not substantive rules but the institutional framework for producing such rules” McGraw, above n 26, 18.

⁴⁵ Shine, above n 5, 14; The Conference of the Parties to the CBD has the capacity to adopt and amend annexes to the CBD that enter into force one year after adoption (CBD, Article 30).

⁴⁶ CBD, Article 6(b).

⁴⁷ CBD, Article 14.

⁴⁸ CBD Executive Secretary, *Voluntary Guidelines on Biodiversity-Inclusive Impact Assessment*, UNEP/CBD/ COP/8/27/Add.2 (2006).

provided by PEPAT.⁴⁹ Although few AT Parties have reported on their Antarctic activities to the CBD Executive Secretary, Germany identifies PEPAT's Annex I EIA process as a partial manifestation of Article 14 of the CBD.⁵⁰ Moreover, domestic implementation is not widespread. Only Chile reported in the Third National Reports to the CBD incorporating biosecurity risk assessments into EIA and SEA processes on a domestic level.⁵¹ A rigid application of the requirements of Article 14 of the CBD to the AT area would mandate strategic consideration of NNS issues throughout their domestic programs.⁵²

In addition, to elaborate the general provision, the CBD COP established Guiding Principles for the implementation of Article 8(h) providing for a hierarchical approach to NNS management: prevention first, followed by eradication and control, with support from monitoring activity.⁵³ AT Parties are not obliged to apply the principles to their Antarctic operations but in the decision annexing the principles the Council of Parties requests Parties to "review, in the light of the Guiding Principles, relevant policies, legislation and institutions to identify gaps, inconsistencies and conflicts, and as appropriate, adjust or develop policies legislation and institutions".⁵⁴ Although not specifically invoking the provision, the CEP Working Plan on NNS proposes an identical approach, with the ATS developing guiding principles and integrating NNS concerns into existing provisions.⁵⁵ Certainly, the precautionary and ecosystem approach, focus on cooperation and information sharing between states and hierarchical approach to NNS management is broadly consistent with the principles of the ATS⁵⁶ and complements the approach of the CEP. Direct application in the Antarctic, however, relies on consistency with domestic processes and the Guiding Principles have not been widely implemented by AT Parties.⁵⁷ Nevertheless, they offer a useful model for meeting the terms of reference of the Biosecurity ICG.⁵⁸ Beyond the Guiding Principles, the CBD Secretariat has assembled

⁴⁹ See above Section 2.2.1.1.

⁵⁰ Germany, above n 42, 207.

⁵¹ See Appendix 5: Analysis of Implementation of Biosecurity Measures in the CBD by AT Consultative Parties and CCAMLR Members Based on National Reports submitted under Article 26 of the CBD, submitted 2001-2009

⁵² See below, *Chapter 5, Section 5.3.2.1*.

⁵³ CBD COP 6, *Guiding Principles for the Implementation of Article 8(h)* Decision VI/23 (2002) ('CBD Guiding Principles') CBD Review, [19]; Riley, above n 6, 332.

⁵⁴ CBD Guiding Principles, [10].

⁵⁵ Australia, France and New Zealand, *A Work Program for CEP Action on NNS* ATCM XXXII WP 5 (2009).

⁵⁶ See Chapter 5, Figure X.

⁵⁷ See Appendix 5: Analysis of Implementation of Biosecurity Measures in the CBD by AT Consultative Parties and CCAMLR Members Based on National Reports submitted under Article 26 of the CBD, submitted 2001-2009.

⁵⁸ See below, *Chapter 5, Section 5.3.2.1 and Appendix 2: Biosecurity Work Plan for the CEP*.

a number of key tools and guidance relevant to individual pathways in Antarctica, including civil air transport,⁵⁹ marine and aquatic pathways,⁶⁰ and military and scientific research.⁶¹ Many of the guidelines reference specific AT Party activity, highlighting the expertise already existing in AT Party operations and the potential for similar information sharing in the Antarctic context.⁶²

⁵⁹ The *Convention on International Civil Aviation 1944*, opened for signature 7 December 1944. 15 *United Nations Treaty Series* (entered into force 4 April 1947) permits States to implement “customs and immigration procedures” and addressed the issue of disinsection through resolutions of the International Civil Aviation Organization (‘ICAO’), ICAO, *Non-chemical disinsection of the aircraft cabin and flight deck for international flights* Resolution A36-24 (2007); GISP is in the process of raising funds to analyse the results of an international survey on disinsection methods and develop guidelines for invasive species prevention in air transport, Economic Commission of ICAO, *Implementation of Resolution A35-19: Preventing the Introduction of Invasive Alien Species*, Resolution A36-WP/19 EC/4 (2007); CBD Review [84].

⁶⁰ Specifically, technical guidelines suggest a treatment option for hull fouling: T Munk and Propulsion Dynamics Inc, *Fuel Conservation through Managing Hull Resistance* (2006) Motorship BIMCO Propulsion Conference, Copenhagen, 27 May 2009.

⁶¹ See CBD Secretariat, *Invasive Alien Species Portal/Guidance and Tools* (April 2009), <<http://www.cbd.int/invasive/tools.shtml>> at 10 April 2010.

⁶² The military section refers to United States and Australian Guidelines, e.g. C Westbrook and K Ramos, *Under Siege: Invasive Species on Military Bases*, National Wildlife Federation Report (2005) and Australian National Practices (Australian Quarantine Inspection Service (‘AQIS’), *Cleaning Instructions – Personal Equipment* (2004), AQIS, *Foreign Military Equipment and Personnel; Guidelines for Offshore Inspection*, (2006); scientific guidelines refer to SCAR, *SCAR’s Environmental Code of Conduct for Terrestrial Field Research in Antarctica*, ATCM XXXII IP 04 (2009).

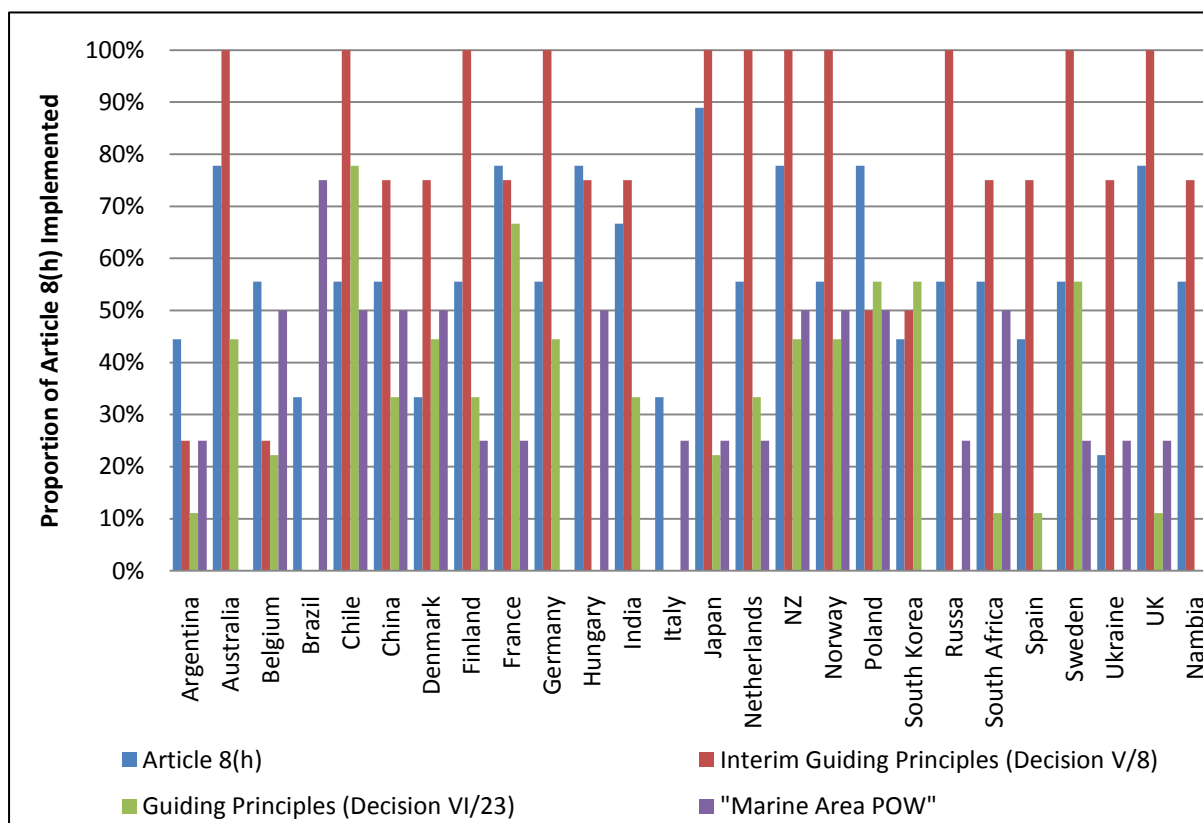


FIGURE 3.1: SELF REPORTED LEVEL OF IMPLEMENTATION OF ARTICLE 8(H) OF THE CBD BY CONSULTATIVE PARTIES TO THE AT⁶³

Another element of the CBD system that has relevance to the Antarctic area is the national reporting system that provides for assessing the extent States comply with Article 8(h), the associated Decisions of the CBD COP and the CBD Guiding Principles.⁶⁴ The Third National Report to the CBD Executive Secretary contained 12 questions on Article 8(h), focussing on the development and implementation of national invasive species strategies and action plans and the guiding principles.⁶⁵ In addition to encouraging compliance, the questions effectively elaborate what is needed to implement the provisions of the Convention.⁶⁶ However, approximately 55% of the measures are

⁶³ Appendix 5: Analysis of Implementation of Biosecurity Measures in the CBD by AT Consultative Parties and CCAMLR Members Based on National Reports submitted under Article 26 of the CBD, submitted 2001-2009.

⁶⁴ Sands, above n 54, 180-182.

⁶⁵ See below, Table 3.1; CBD Review, Annex I, (1).

⁶⁶ CBD, Article 26; Executive Secretary of CBD, *Reporting Mechanisms under the Convention and Other Conventions*, (2005) UNEP/CBD/WG-RI/1/10, 1.

implemented by AT Parties, indicating the content of the questions do not create any form of customary norms. The provision of similar questions in the reporting process under Article 17 of PEPAT will not necessarily assist compliance. The reports permit the more comprehensive analysis of the effectiveness of the CBD's approach, indicating that NNS issues are not adequately addressed by Parties to the Convention, particularly in regards to the marine environment.⁶⁷ Although the provision of guidelines has assisted the implementation of the broad Article 8(h) obligation, the report demonstrates that most States are not equipped with the institutional support, knowledge base or comprehensive ATS strategy that is necessary for an effective biosecurity system.⁶⁸ This suggests that much more needs to be done within the ATS and in the CBD to ensure biosecurity obligations exist and that Parties have the technical capacity to address the risks of NNS, particularly to vulnerable and valued environments like the Antarctic continent.

⁶⁷ See Appendix 5: Analysis of Implementation of Biosecurity Measures in the CBD by AT Consultative Parties and CCAMLR Members Based on National Reports submitted under Article 26 of the CBD, submitted 2001-2009; The CBD Review listed the reasons for low levels of implementation as: insufficient human, technical, institutional and logistical capacity; Limited institutional coordination...; Lack of political will [and]...policies; Limited public awareness of the seriousness of the situation; inadequate policy and legal frameworks; and lack or limited financial resources...."; CBD Review, 5, [12].

⁶⁸ Ibid, Annex 1: [29].

TABLE 3.1: ELABORATION OF IMPLEMENTATION OF ARTICLE 8(H) THROUGH THIRD NATIONAL REPORT QUESTIONS AND SYNTHESIS OF AT PARTY RESPONSES

Questions under Third National Reports to the Executive Secretary of the CBD	% AT Party Compliance
1. Prioritisation of Article 8(h).	65%
45. Identification and tracking systems for NNS.	50%
46. Risk assessment carried out.	62%
47. Measures to prevent the introduction of, control or eradicate NNS.	56%
48. International cooperation including the exchange of best practices for purpose of reducing risks of NNS.	74%
49. Ecosystem, Biogeographic and Precautionary approach to NNS	73%
50. National needs and priorities for implementing CBD Guiding Principles	12%
51. Coordinate national programs to apply the Guiding Principles.	8%
52. Review relevant policies, legislation and institutions in the light of the Guiding Principles and adjust or develop policies, legislation and institutions.	33%
53. Enhance cooperation between various sectors in order to improve prevention, early detection, eradication and/or control of invasive species.	27%
54. Collaborate with trading partners and neighbouring countries to address threats of invasive alien species to biodiversity in ecosystems that cross international boundaries.	27%
55. Use risk assessment to address threats of invasive alien species to biodiversity and incorporate such methodologies in environmental impact assessment ('EIA') and strategic environmental assessment ('SEA').	35%
160. Mechanisms to control potential invasions from ballast water, hull fouling, aquaculture and accidental releases, such as aquarium releases, put into place.	69% (Ballast) 4% (Hull) 54% (Aqua) 0% (Acci)

3.2.1.2 ANTARCTICA AS A PROTECTED AREA: INTERNATIONAL ELABORATION AND GUIDANCE

Another tool mandated by the CBD to protect “in-situ” conservation is the establishment and management of protected areas,⁶⁹ defined broadly as “a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives.”⁷⁰ As indicated above, the designation of Antarctica as a “natural reserve” under PEPAT is consistent with the CBD definition of a protected area. The consequences of being a protected area under the CBD for biosecurity are not immediately evident, other than harmonising the approach of the international community and AT Parties. The obligations created by Article 8 of the CBD do not complement PEPAT by expressly addressing NNS or create additional tools to benefit AT Parties.⁷¹ In addition, although the CBD COP has established a program of work that identifies NNS as a key threat to

⁶⁹ CBD, Articles 8(a)-(e).

⁷⁰ CBD, Article 2.

⁷¹ CBD, Articles 8(b)(c)(d).

protected areas, it does not expressly provide for NNS consideration in screening or scoping processes.⁷²

The CBD COP is instrumental in encouraging other area protection regimes to address NNS threats.⁷³ The Ramsar Convention already actively address the management of NNS risks in the designated areas⁷⁴ and the World Heritage Convention requires reporting of generic threats to the values protected in the area.⁷⁵ The World Heritage Convention has been specifically evoked to encourage NNS control action in the sub-Antarctic environment.⁷⁶ There is significant utility in designating areas under these Conventions due the broad implementation of protected area processes in AT Parties and non-AT Parties' domestic processes.⁷⁷ The designation of a protected area engages certain legal processes under the ratifying instrument of the protected area regime. Where NNS are addressed by the regime, NNS threats will be addressed.⁷⁸ However, designating Antarctica or biologically sensitive areas of Antarctica as a protected area in other regimes is outside the scope of most area

⁷² CBD COP, *Protected areas (Articles 8(a) to (e))* Decision VII/28 (2004), Goal 1.5.3, "To take measures to control risks associated with invasive alien species in protected areas."

⁷³ The CBD invites: "...the [Convention on Wetlands of International Importance Especially as Waterfowl Habitat, opened for signature 21 December 1975. 996 United Nations Treaty Series 245 (entered into force 21 December 1975) ('Ramsar Convention')]...the [Convention for the protection of the world cultural and natural heritage, opened for signature 9 March 1977, 1037 United Nations Treaty Series 151 (entered into force 17 December 1975) ('World Heritage Convention')] and the Man and the Biosphere Programme of the United Nations Educational, Scientific and Cultural Organisation ('UNESCO')...to promote further the implementation of Article 8(h) within their mandates through, inter alia, the development of guidance, best practices, and pilot projects that address the threats of invasive alien species to particular sites or habitats..." CBD COP, *Alien species that threaten ecosystems, habitats or species* Decision VI/23 (2002), [16].

⁷⁴ Ramsar Convention COP, *Invasive Species and Wetlands* Resolution VII.14 (1999); *Ramsar Handbook 3: Laws and Institutions*, (3rd ed, 2007), 29.

⁷⁵ World Heritage Convention, Section 29; United Nations Educational, Scientific and Cultural Organisation ('UNESCO'), *Operational Guidelines for the Implementation of the World Heritage Convention*, Annex II, WHC, 81/01, (2008), [48-56].

⁷⁶ Macquarie Island is designated a World Heritage space, primarily due to its unique geological features rather than its biological features; UNESCO, *Report of the 21st Session of the World Heritage Committee*, WHC-97/CONF.208/17 (1998), n(i)(iii) but the World Heritage Committee nevertheless encourages action on the NNS problems and requests Australia invite a World Heritage Centre/IUCN monitoring mission to assess conservation of the property; UNESCO, *Report of the 31st Session of the World Heritage Committee*, WHC-07/31.COM/7B.14 (2007).

⁷⁷ Eighteen of the 22 Consultative Parties to the AT who submitted Third National Reports to the CBD established "suitable time bound and measurable national-level protected area targets and indicators" under the programme of work, *Appendix 5: Analysis of Implementation of Biosecurity Measures in the CBD by AT Consultative Parties and CCAMLR Members Based on National Reports submitted under Article 26 of the CBD*, submitted 2001-2009.

⁷⁸ For example: see Argentina, *Law no 22.351* (1980) (prohibiting introduction, transportation and propagation of alien species in all protected areas).

protection regimes beyond the ATS.⁷⁹ The areas can, however, be categorised in a consistent manner, which can promote implementation and legitimacy.⁸⁰ The CBD COP promotes the value of a single international classification system through the six IUCN categories.⁸¹ Several states utilise the categories in their domestic legislation⁸² and the designation of Antarctic areas under the IUCN offers a consistent terminology to encourage third parties to adopt a precautionary approach to the areas. The UNEP World Conservation Monitoring Centre ('WCMC') and IUCN prepared a list of all protected areas in 2002 and despite not all protected area agencies assigning IUCN categories, over 67% of the total number and 81% of the area utilised the category system.⁸³ Sub-Antarctic islands and marine areas are predominantly protected as Strict Nature Reserves under the categories limiting access to scientific endeavours.⁸⁴ The IUCN 2003 List notes the Protocol's protection on the Antarctic and comments, "the world's protected areas estate has increased considerably as a result of this Protocol."⁸⁵ Although the ATS has not specifically allocated the areas under the AT to any particular IUCN category, the entire area arguably fits into the concept of a Category V: Multiple Use Area; protected landscapes or seascapes "managed mainly for conservation and recreational purposes."⁸⁶ Certainly, consistent allocation of IUCN categories across area protection regimes increases clarity in international area protection regimes.⁸⁷ In addition, if aligned with a strategic focus on biosecurity across protected area categories, it could allow for consistency of biosecurity protection across areas protected for their natural values.

⁷⁹ For example: although all AT Parties have ratified Ramsar and the World Heritage Convention, Contracting Parties can only designate suitable wetlands or heritage places within their own territories; Ramsar Convention, Article 2.1; World Heritage Convention, Article 3.

⁸⁰ A Gillespie, 'Defining Internationally Protected Areas' (2009) 12 *Journal of International Wildlife Law and Policy* 229, 247.

⁸¹ CBD COP, *Protected areas (Articles 8(a) to (e))* Decision VII/28 [31]; CBD COP, *Protected Areas* Decision IX/18 (2006) (9); detailed descriptions of the categories can be found in the IUCN, *Guidelines for Protected Areas Management Categories* (1994), <http://www.unep-wcmc.org/protected_areas/categories/eng/index.html> at 13 March 2009. Although the categories refer to government levels of coordination, the Guidelines make specific reference to the Antarctic in accepting that such unified ownership is not always necessary.

⁸² See for example: EPBC Act (Australia), Section 347-348; World Commission on Protected Areas ('WCPA'), *Application of IUCN Protected Area Management Categories: Draft Australian Handbook* (2000), <http://www.unep-wcmc.org/protected_areas/categories/australia.pdf> at 4 March 2010.

⁸³ S Chape, *et al*, *2003 United Nations List of Protected Areas*, IUCN and UNEP-WCMC (2003), <http://www.unep-wcmc.org/wdpa/unlist/2003_UN_LIST.pdf> at 10 June 2010.

⁸⁴ *Ibid*, Table 5, 30.

⁸⁵ *Ibid*.

⁸⁶ A Phillips, *Management Guidelines for IUCN Category V Protected Areas: Protected Landscapes/Seascapes*, Best Practice Protected Areas Guidelines Series No. 9 (2002), 8.

⁸⁷ See: Gillespie, above n 78, 246-247.

3.2.1.3. DEVELOPING THE CONCEPT OF INTRODUCER PAYS: LIABILITY IN THE CBD

Although the issues with applying liability to biosecurity have not been rectified at the international level, the application of liability as a deterrent has been given some attention. Specifically, the requirement that a person responsible for pollution should bear the costs has not achieved the status of a generally applicable rule of customary international law, but the issue has been addressed in a number of treaty regimes.⁸⁸ In 2001 the ILC confirmed as matter of customary international law the independent duty to cease a wrongful act and make reparation when a State breaches an international obligation.⁸⁹ The ILC contemplated damage to biodiversity, noting it is “as a matter of principle, no less real and compensatable than damage, though [it] may be more difficult to quantify.”⁹⁰ CBD Parties left the question of liability open in the negotiation of the CBD,⁹¹ and since then seven decisions of the CBD COP address the issue, establishing parameters through the Executive Secretary and urging parties to develop liability regimes for the prevention of damage to biological diversity.⁹² Fourteen out of the 22 Consultative Parties to the AT that have submitted Third National Reports to the CBD report putting into place national legislative, administrative or policy measures regarding liability and redress for damage to biological diversity.⁹³ These include some measures relevant to NNS.⁹⁴ The IUCN Guidelines identify the particular difficulty in applying liability regimes to the unintentional introduction of NNS, although proposes potential options in mandatory insurance,⁹⁵ deposit/performance bonds and fees and levies to generate funds for rapid response.⁹⁶ At CBD COP 10, Parties intend to set out a multi-year work program for liability and redress, the

⁸⁸ P Sands, above n 34, 281, e.g. European Community, Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage, (2004) Official Journal L 143, 56: framework regulations governing liability for biodiversity damage: If environmental damage has occurred to species or habitats of the Habitats Directive, or if there is a danger of such damage, this requires the responsible party to take the necessary measures to avert danger and to minimise and remedy damage.

⁸⁹ ILC, *Draft Articles on Responsibility of States for Internationally Wrongful Acts*, (2001), 56 U.N. GAOR Supp. (No. 10) at 43, N Doc. A/56/10 <<http://untreaty.un.org/ilc/summaries/9.htm>> at 9 February 2009.

⁹⁰ J Crawford, *The International Law Commission's Articles on State Responsibility: Introduction, Text and Commentaries* (2002), 118.

⁹¹ CBD, Article 14(2).

⁹² CBD, *Liability and Redress*, Decision IX/23 (2008), 3 (also lists other relevant Decisions).

⁹³ European Community nations under the AT are now obliged by *Directive 2004/35/CE* (above n 88) to address biodiversity damage through liability measures.

⁹⁴ Shine, above n 5, 81-82 (Australia, France, Hungary, and Poland).

⁹⁵ Argentina's draft Biosecurity Strategy suggests mandatory insurance to cover the risk of escapes, damage to third parties and the limited cost of eradication measures; *Ibid*, 83.

⁹⁶ *Ibid*.

results of which could have significant utility to AT Parties and the application of Annex VI to PEPAT to a biosecurity framework.

3.2.1.4 SUMMARY OF BIOSECURITY IN THE INTERNATIONAL CONSERVATION OF BIODIVERSITY

The global biodiversity law applicable to NAPs in Antarctica is limited since the values associated with Antarctica are quite different to the values associated with other areas of the world. The international law surrounding biosecurity has developed to focus primarily on the risks to industry and biodiversity.⁹⁷ PEPAT concepts of scientific utility, wilderness and aesthetic values are not as prevalent in the international system. The precautionary baseline acceptable for risks associated with NNS differs if the goal is comprehensive protection of the environment and the related scientific utility of the area, or conservation of biodiversity including sustainable use. Thus, the ATS remains the primary source of relevant biosecurity obligations.

However, the CBD provides for strategic planning and impact assessment, a categorised reporting process, harmonisation of area protection processes and a discussion of liability which benefit consideration in an Antarctic context. More fundamentally, a biosecurity framework relies on stakeholder involvement and whether claimant States accept the legitimacy of other States or not, the greater international community has an interest in the conservation of Antarctic biodiversity.⁹⁸ The CBD is the ideal forum to address the interests of the wider world community and allow for better integration and harmonisation of global biosecurity development with Antarctic biosecurity. Domestic biosecurity processes are subject to the obligations of the CBD and aligning the international and regional approach permits more consistent implementation across NAPs. Methods to achieve these goals will be addressed in Chapter Five.

3.2.2 BIOSECURITY AND THE LAW FOR THE SOUTHERN OCEAN

Due to the balance between Article IV and territorial sovereignty, the relationship between UNCLOS and Antarctic marine areas remains complex and unsettled.⁹⁹ Without clear delineation of maritime

⁹⁷ Ibid, 13-14.

⁹⁸ Indicated by the UN remaining seized on the “Antarctic issue”, despite the outstanding matter of mineral exploitation, South African involvement and inclusivity being resolved (the latter is disputable); P J Beck, ‘The United Nations and Antarctica, 2005: the end of the ‘Question of Antarctica?’ (2006) 42(3) *Polar Record* 217, 226.

⁹⁹ See above, *Chapter 2, section 2.1.1.2.*

zones, the high seas regime has particular relevance in the Southern Ocean.¹⁰⁰ However, domestic biosecurity arrangements traditionally address risks to maritime zones and domestic economic value and do not contemplate risks to areas outside national jurisdiction.¹⁰¹ However, the CBD's programme of work on the conservation and sustainable use of marine and coastal biodiversity expressly applies to high seas outside national jurisdiction and identifies invasive species as a key theme in the programme of work.¹⁰² There is also some provision for high seas biosecurity in the international law of the oceans,¹⁰³ particularly in UNCLOS, MARPOL 73/78 and the yet to enter force Ballast Water Convention. In particular, UNCLOS codifies and confirms a number of customary law norms,¹⁰⁴ including a requirement for States to "take all measures necessary to prevent, reduce and control the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment which may cause significant and harmful changes thereto."¹⁰⁵

In addition, the active role of the IMO in regulating ships operating in the Antarctic area is an important element in any regulation of ocean activity.¹⁰⁶ However, UNCLOS expressly permits marine scientific research in "the water column beyond the limits of the exclusive economic zone"¹⁰⁷, arguably creating a duty to promote and facilitate marine scientific research and create favourable conditions for such research.¹⁰⁸ The considerable gaps in international law relevant to biosecurity in marine areas¹⁰⁹ and the customary immunity conferred on government-operated non-commercial ships,¹¹⁰ which make up the vast majority of marine activity in the Antarctic area related to science and its support, significantly limit the scope of preventative measures under the law of

¹⁰⁰ C C Joyner, *Antarctica and the law of the sea* (1992), 185.

¹⁰¹ Shine, above n 5, 12.

¹⁰² CBD COP, *Conservation and sustainable use of marine biological diversity* Decision II/10 (1995), Annex II, elaborated in CBD COP, *Conservation and sustainable use of marine and coastal biological diversity, including a programme of work* Decision VII/5 (2004), Annex I; C.

¹⁰³ The interaction and potential conflict between the CBD and UNCLOS is discussed in some detail in C H Allen, 'Protecting the Oceanic Gardens of Eden: International Law Issues in Deep-Sea Vent Resource Conservation and Management,' (2001) 13 *Georgetown International Law Review* 563, 606-609.

¹⁰⁴ H Hohmann, *Precautionary Legal Duties and Principles of Modern International Environmental Law* (1994), 216-217.

¹⁰⁵ UNCLOS, Article 196.

¹⁰⁶ See for example: P Vigni, 'Antarctic Maritime Claims: "Frozen Sovereignty" and the Law of the Sea' in A G Oude Elferink, and D R Rothwell (eds.), *The Law of the Sea and Polar Maritime Delimitation and Jurisdiction* (2001), 102-103.

¹⁰⁷ All States and competent international organizations; UNCLOS Article 87(1)(f); Article 257.

¹⁰⁸ UNCLOS, Articles 239, 242-243; Allen, above all 103, 640.

¹⁰⁹ I Meliane and C Hewitt, *Gaps and Priorities in Addressing Marine Invasive Species*, IUCN Information Document (2005).

¹¹⁰ See for example: UNCLOS; Article 32, Article 95-6; Ballast Water Convention, Article 3(e); PEPAT, Annex IV, Article 11 (1).

the sea.¹¹¹ The following section will examine the gaps in the international law of the sea relevant to biosecurity and the extent to which the law applies to the Antarctic marine area.

3.2.2.1. ALIENS UNDER UNCLOS: POLLUTION OR PESTS

UNCLOS requires flag States to prevent vessel-sourced pollution in areas beyond their jurisdiction through the adoption of relevant rules and standards¹¹² and port States with the means to impose those rules on third party States¹¹³ but Article 196(2) explicitly excludes the requirement to take measures to reduce harmful impacts of NNS from the ambit of general pollution.¹¹⁴ However, the definition of pollution in UNCLOS is broad and includes the “introduction by man, directly or indirectly of substances or energy into the marine environment... which results or is likely to result in... harm to living resources and marine life...”¹¹⁵

Whether ballast water or NNS generally could be considered pollution under the definition is debatable.¹¹⁶ The treaty should be interpreted “in good faith in accordance with the ordinary meaning to be given to terms of the treaty in their context and in the light of its object and purpose”.¹¹⁷ A substance refers to “a particular kind of matter with uniform properties,”¹¹⁸ which Firestone and Corbett argue fits comfortably with ballast water.¹¹⁹ However, living organisms are not contemplated in the drafting of the definition¹²⁰ and including NNS increases the definition of substance too broadly.¹²¹ Arguably anything could be a substance, as long as it is harmful. Including,

¹¹¹ K R Wood, ‘The Uncertain Fate of the Madrid Protocol to the Antarctic Treaty in the Maritime Area,’ (2003) 34 *Ocean Development and International Law* 139, 142.

¹¹² UNCLOS, Article 211(2).

¹¹³ Ibid, Article 25(2); Article 211(3).

¹¹⁴ Ibid, Article 194(2); Article 211(2); J Firestone and J Corbett, ‘Coastal and Port Environments: International legal and Policy Responses to Reduce Ballast Water Introductions of Potentially Invasive Species,’ (2005) 36 *Ocean Development and International Law* 302.

¹¹⁵ UNCLOS, Article 1(4).

¹¹⁶ For an extensive dissection of the definition see; Firestone and Corbett, above n 114, at n 134 and K Scott, ‘Defending the world below the brine: Managing alien invasive species under the 2004 Ballast Water Convention – A New Zealand perspective’, (2008) 14 *Journal of International Maritime Law* 308, 319.

¹¹⁷ VCLT, Article 31(1).

¹¹⁸ Compact Oxford Dictionary (2010), <http://www.askoxford.com/results/?view=dev_dict&field-12668446=substance&branch=13842570&textsearchtype=exact&sortorder=score%2Cname> at 27 March 2010.

¹¹⁹ Firestone and Corbett, above n 114, n 134.

¹²⁰ L S Johnson, *Coastal State Regulation of International Shipping* (2004), n 390, 111-112.

¹²¹ C.f. the evolution of “energy” in the definition to include noise; K Scott, ‘International Regulation of Undersea Noise’, (2004) 53 *International Comparative Law Quarterly*, 287, 293-294.

for example, the introduction of fishing vessels or humans into the Antarctic, is a useful but absurd consequence of broadening the definition. Living biotic matter is an extremely complex collection of molecules that does not seem appropriate to address in the same manner as other forms of operational discharge. The context of Article 196(1) supports this interpretation, defining the harm from invasive species as distinct from “pollution of the marine environment resulting from the use of technologies under their jurisdiction and control”. In addition, the Ballast Water Convention distinguishes between “uptake and discharge of Ballast Water and Sediments” and “pollution incidents from the ship,”¹²² and although IMO delegates considered annexing the Ballast Water Convention to MARPOL 73/78,¹²³ they did not.¹²⁴ Thus, the substantive provisions of Part XII of UNCLOS are not applicable to NNS, other than those conveyed through other forms of pollution, including sewage and oily ballast discharge.¹²⁵

3.2.2.2. “DO NOT SWIM NEAR THIS PIPE”: LAND BASED POLLUTION

Although a significant proportion of AT Parties have adopted treatment systems consistent with the protection of the Antarctic environment, the considerable biosecurity risks posed by the discharge from stations of macerated sewage into the Antarctic environment is not addressed expressly in the texts of PEPAT or its Annexes.¹²⁶ UNCLOS provides that States should adopt laws and regulations to prevent, reduce and control pollution from land based sources.¹²⁷ All AT Parties have adopted the non-binding Global Programme of Action for the Protection of the Marine Environment from Land Based Activities¹²⁸ (‘GPA’) which elaborates the requirements in UNCLOS, committing States to developing comprehensive treatment systems for the discharge of untreated sewage into the marine environment.¹²⁹

¹²² Ballast Water Convention, Regulation A-3.3.

¹²³ Firestone and Corbett, above n 113, 294.

¹²⁴ Ibid, 295.

¹²⁵ The identification in MARPOL, Annex IV demonstrates that untreated sewage comes within the ambit of marine pollution (see below). In addition, sewage is explicitly identified as marine pollution in the non-binding *Washington Declaration for the Protection of the Marine Environment from Land-based Activities* (adopted 1 November 1995).

¹²⁶ See above, Chapter 2, Section 2.2.1.4

¹²⁷ UNCLOS, Article 197 and 207.

¹²⁸ UNEP, *Global Programme of Action for the Protection of the Marine Environment from Land-based Activities*, UNEP(OCA)/LBA/IG.2/7 (1995), [5].

¹²⁹ GPA, 96; “By the year 2025, dispose of all sewage, waste waters, and solid wastes in conformity with national or international environmental quality guidelines.”

Although UNCLOS does not expressly include activities outside national jurisdiction, the GPA encourages States to develop regional approaches where transboundary harm is threatened. UNCLOS's focus on national based jurisdiction in the high seas implies a similar extension to land based activities outside the scope of territorial jurisdiction.¹³⁰ The GPA does not create a binding obligation but it puts an onus on AT Parties to develop a comprehensive waste water strategy to address potential biosecurity threats through targets for sources and treatment. In addition, UNEP and GPA have produced guidelines on developing appropriate approaches to regional waste water management and highlight the importance of regional agreements.¹³¹ The development of global waste water practices has already indirectly impacted on Antarctic activities.¹³² One of the factors contributing to the decision to install a new treatment plant at New Zealand's Scott Base was to achieve consistency with national standards, in turn based on compliance with the GPA.¹³³ AT Parties should ensure their Antarctic operations meet or exceed the domestic targets for implementing the GPA's recommendations.

3.2.2.3. NNS UNDER MARPOL 73/78: VESSEL SOURCED DISCHARGE

A number of AT Parties apply MARPOL 73/78 on their vessels to the exclusion of the more substantive elements of PEPAT.¹³⁴ Vessels have two options for the disposal of biosecurity threats generated as part of ship processes: discharge into the sea or into port reception facilities.¹³⁵ In the case of biosecurity threats from sewage and garbage, the international regulatory framework favours the former. The preferred method is treating the discharge or discharging at sufficient distance from shore to minimise the impacts of pollution. Unlike land-sourced pollution, binding international regulations under the IMO govern vessel-sourced pollution. The "relevant rules and standards" that flag States must comply with to avoid vessel-sourced pollution under UNCLOS¹³⁶ are

¹³⁰ GPA, 98(a).

¹³¹ UNEP, *Implementation of the GPA at regional level: The role of regional seas conventions and their protocols* (2006) <http://www.gpa.unep.org/documents/lbsa_protocols_for_the_english.pdf> at 29 April 2010, 24-25.

¹³² M A Connor, 'Wastewater treatment in Antarctica,' (2008) 44 (229) *Polar Record* 165, 166.

¹³³ New Zealand, *A new wastewater treatment system for New Zealand's Scott Base – rationale, selection process and outcome* ATCM XXV IP 32 (2002).

¹³⁴ See above Chapter 2, Section 2.2.1.4; See also *Appendix 8: Antarctic Actors Treaty Matrix*.

¹³⁵ L A La Fayette, 'The Sound Management of Wastes Generated at Sea: MARPOL, not Basel', (2009) 39 (4/5) *Environmental Policy and Law* 207, 211.

¹³⁶ UNCLOS, Article 197 and 211(2).

interpreted to imply the rules found in MARPOL 73/78.¹³⁷ Although MARPOL 73/78 also refers broadly to reducing the risks of introducing “harmful substances”, the instrument focuses on six specific substantive Annexes, explicitly including the biosecurity threats associated with sewage and garbage but excluding ballast water.¹³⁸ Annex IV of PEPAT directly invokes MARPOL 73/78 and the AT area is defined as a “Special Area” under Annex I, II and V, instituting more stringent requirements on vessels discharging in the Antarctic area. Annex IV prohibits ships¹³⁹ from discharging sewage into the sea within 12 nautical miles of land, unless the ship has an approved sewage treatment plant or is discharging comminuted and disinfected sewage. Requiring the treatment of sewage implicitly addresses the biosecurity risk posed by sewage and a performance standard is introduced to ensure treatment systems do not expose the environment to unacceptably high risks of introduction.¹⁴⁰

Implementation by AT Parties is supported by the explicit evocation of MARPOL 73/78 in Annex IV of PEPAT and the higher standard, although only applies where the measures do not “unduly impair Antarctic operations.”¹⁴¹ New Zealand has not adopted Annex IV of MARPOL 73/78 but still applies the provision to ships visiting the Antarctic area.¹⁴² However, the focus of the instrument is primarily on designing and certifying ships to reduce discharge; the biosecurity threat posed by the sewage is not identified. No measures are imposed to evaluate the effectiveness of the measures on marine biodiversity or monitor the impacts of exposing the marine environment to NNS. Moreover, the Special Area provisions of Annex V do not contain any explicit biosecurity requirements. Although the Annex prohibits ships¹⁴³ disposing food wastes within 12 nautical miles from land, neither the instrument nor its accompanying guidelines make any reference to the risks associated with NNS.¹⁴⁴ This creates a significant discrepancy between the rules applied to AT Parties through Annex IV and those on non-Parties to the AT area. In addition, apart from requiring port states to provide

¹³⁷ Scott, above n 116, 319

¹³⁸ Firestone and Corbett, above n 113, 295.

¹³⁹ MARPOL 73/78, Annex IV has restricted scope, only applying to ships “certified to carry more than 15 persons,” although covers a significant proportion of Antarctic shipping. Regulation 2, Annex V, MARPOL 73/78.

¹⁴⁰ MARPOL 73/78, Annex V, Regulation 9; MEPC, *Revised Guidelines on implementation of effluent standards and performance tests for sewage treatment plans* Resolution MEPC.159(55) (2006).

¹⁴¹ PEPAT, Annex IV, Article 6.

¹⁴² *Marine Protection Rules Part 160: Prevention of Pollution by Sewage by Ships in the Antarctic Treaty Area* (NZ).

¹⁴³ MARPOL 73/78, Annex V applies to all ships: Regulation 2.

¹⁴⁴ *Ibid*, IMO, *IMO Guidelines for the Implementation of Annex V of MARPOL* (2nd ed., 2006).

discharge facilities,¹⁴⁵ MARPOL 73/78 does not elaborate any further areas of port state responsibility.¹⁴⁶ The weakness of the instrument is in its onus on flag states protecting against marine pollution, rather than identifying the reduction of marine pollution as a means to an end for the protection of the environment, and consequentially the reduction of biosecurity threats.

3.2.2.4. NNS UNDER THE BALLAST WATER CONVENTION: MANAGING THE ALIEN WITHIN

In contrast to MARPOL 73/78, the environmental focus of the Ballast Water Convention reflects PEPAT's principles of environmental protection and creates an explicit scope for port state responsibility.¹⁴⁷ Once it is in force,¹⁴⁸ the Ballast Water Convention will provide a set of binding international regulations reducing the biosecurity threat of ballast water internationally. Domestic biosecurity arrangements have traditionally focussed on excluding introductions in the domestic environment.¹⁴⁹ In contrast, the Ballast Water Convention provides mechanisms to eliminate the risks internationally, including requiring port states to identify areas of high risk uptake and providing for more effective departure state jurisdiction.¹⁵⁰ The central objective is "to prevent, minimise and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments."¹⁵¹ Similar to sewage and garbage, limiting the biosecurity threat involves either treating discharge or requiring discharge at port state facilities. The instrument creates two levels of obligations to manage ballast and sediment for flag states and coastal and port state. Parties must ensure that vessels flying their flag plan to avoid unnecessary discharge and the uptake of harmful NNS,¹⁵² keep a ballast water record book¹⁵³ and manage ballast water and sediment uptake and discharge by meeting a performance standard

¹⁴⁵ MARPOL 73/78, Article V(1).

¹⁴⁶ This does not prevent States taking additional port state measures; see below *Section 3.3.2*.

¹⁴⁷ Scott, above n 116, 312.

¹⁴⁸ The Ballast Water Convention will enter force 12 months after the ratification of 30 States representing at least 35 percent gross tonnage of the world's merchant shipping; Article 18(1) Ballast Water Convention, as of June 2010, 24 States representing 24.44% of the world's merchant shipping had ratified the Convention; see *Appendix 8: Antarctic Actors Matrix* for the list of relevant Parties.

¹⁴⁹ See Chapter 4, Section 2.1.4.

¹⁵⁰ Ballast Water Convention, Regulation C-2; See Section 4.2.

¹⁵¹ *Ibid*, Article 2(1).

¹⁵² *Ibid*, Regulation B-1; IMO Ballast Water Guidelines, Annex [1.1].

¹⁵³ *Ibid*, Regulation B-1, B-2.

by 2012.¹⁵⁴ In the interim, a ballast water exchange standard must be met recommending discharge 200 nautical miles from land but permitting discharge within 50 nautical miles of land.¹⁵⁵ In addition, port states may designate areas suitable for ballast water exchange,¹⁵⁶ prepare for reception of sediments¹⁵⁷ and warn ships away from areas with increased risk.¹⁵⁸ Unusually for an international treaty,¹⁵⁹ the Ballast Water Convention permits Parties to “require ships to meet [additional] specified standard[s] or requirement[s]” to achieve the objective of the Convention.¹⁶⁰ The regulations governing the additional measures are designated “Special Requirements in Certain Areas” implying the measures are likely to apply to certain geographic areas rather than broad environmental strategies?¹⁶¹ Marine protected areas will be addressed later in this Chapter.¹⁶²

Although the Ballast Water Convention explicitly provides for Parties to cooperate to “address threats and risks to sensitive, vulnerable or threatened ecosystems in areas beyond the limits of national jurisdiction”,¹⁶³ the instrument is limited in its capacity to address biosecurity threats, including ballast water discharge in the Antarctic area.¹⁶⁴ The Ballast Water Review Group of MEPC identified the considerable time, technology and cost to design modifications as significant limitations to implementing the Ballast Water Convention.¹⁶⁵ The performance standard itself is limited in scope and may not sufficiently exclude the risk of NNS introduction.¹⁶⁶ Before the performance standard comes into effect, considerable issues associated with open water ballast

¹⁵⁴ Ibid, Regulation B-5.1, D-2; The Ballast Water Convention provides a procedure to assess ballast water management systems (Ballast Water Convention, Regulation D-4), and MEPC gave final approval to ten such systems by July 2009. (MEPC, Report of the MEPC Committee, 59th session 13-17 July 2009, <http://www.imo.org/newsroom/mainframe.asp?topic_id=109&doc_id=11123>; MEPC, *List of ballast water management systems that make use of Active Substances which received Basic and Final Approvals*, BWM.2/Circ.23 (24 September 2009); a further 8 have received basic approval).

¹⁵⁵ Ballast Water Convention, Regulation D1.

¹⁵⁶ Ibid, Regulation B-4.2.

¹⁵⁷ Ibid, Article 5(1); MEPC, *Guidelines for Sediment Reception facilities (G1)*, Resolution MEPC.152 (55) (2006).

¹⁵⁸ Ballast Water Convention, Regulation C-2.

¹⁵⁹ Firestone, above n 115, 297.

¹⁶⁰ Ballast Water Convention, Article 2 (3); Ballast Water Convention Annex, Regulation C-1.

¹⁶¹ Firestone and Corbett, above n 114, 297.

¹⁶² See below, Section 3.2.2.6.

¹⁶³ Ballast Water Convention, Article 2(9).

¹⁶⁴ For a more comprehensive analysis of the shortcomings of the Ballast Water Convention see: Scott, above n 116; Firestone and Corbett, above n 114.

¹⁶⁵ Ibid.

¹⁶⁶ Scott, above n 116, 314-5; S Gollasch, *et al*, ‘Critical Review of the IMO International Convention on the Management of Ships’ Ballast Water and Sediments’ (2007) 6 *Harmful Algae* 585, 590.

water exchange, including safety issues, time delays and the possibility of increased survival rate of individual organisms remaining in the tank, are exacerbated by limitations in the prescribed procedure.¹⁶⁷ Predictably and consistent with other oceans law, the instrument does not apply to all government ships on non-commercial service.¹⁶⁸ It does provide that such ships should “so far as it is reasonable and practicable” act consistently with the Convention but the exclusion of the significant proportion of ships supporting Antarctic science is a significant weakness. In addition, the Ballast Water Convention provides a “bewildering and diverse”¹⁶⁹ range of exemptions and exclusions that cover ship safety,¹⁷⁰ pollution minimisation¹⁷¹ and damage to ship’s equipment,¹⁷² as well as operational location,¹⁷³ prototype testing¹⁷⁴ and risk assessment processes. With particular relevance to the Antarctic area, the Article has no application where a vessel operates exclusively within the waters of a party (including the flag state) and the high seas.¹⁷⁵ Where a vessel is exclusively employed between Antarctica or sub-Antarctic territories and a gateway flag state, ballast water regulations need not apply and there is no obligation to consider the potential impacts on the Antarctic environment.¹⁷⁶ This is clearly inadequate for the environmental principles of PEPAT. Arguably the application of PEPAT precludes any untreated disposal that may lead to NNS introduction but as a number of AT Parties apply the international ocean regime to the exclusion of PEPAT, the limitation under the Ballast Water Convention applies. However, COMNAP’s survey of ballast water practices indicate that most States adopt a precautionary approach to ballast water management, and 17 of the 21 AT Consultative Parties that submitted Third National Reports to the CBD reported implementing mechanisms to reduce the biosecurity threat of ballast water discharge, although only one reported addressing hull fouling. Only five AT Parties have ratified the Ballast

¹⁶⁷ G M Hallegræff, ‘Transport of toxic dinoflagellates via ships’ ballast water: bioeconomic risk assessment and efficacy of possible ballast water strategies,’ (1998) 168 *Marine Ecology Progress Series* 306; O Endresen, *et al*, ‘Challenges in Global Ballast Water Management’ (2004) 48 *Marine Pollution Bulletin* 615, 616.

¹⁶⁸ Ballast Water Convention, Article 3(e).

¹⁶⁹ For a more in-depth description see: Scott, above n 116, 320-323.

¹⁷⁰ Ballast Water Convention, Annex, Regulation A.3.1.

¹⁷¹ *Ibid*, Regulation A.3.3.

¹⁷² Ballast Water Convention, Annex, Regulation A-3.2.

¹⁷³ Ballast Water Convention, Article 3(2)(b).

¹⁷⁴ *Ibid*, Annex, Regulation D-2; MEPC, *Guidelines for Approval and Oversight of Prototype Ballast Water Treatment Technology Programmes* (G10) MEPC 42/WP.1 Annex 2 (2006).

¹⁷⁵ Ballast Water Convention, Article 3(2)(d).

¹⁷⁶ Scott, above n 116, 321.

Water Convention, although at least two others are in the process of implementation.¹⁷⁷ The Ballast Water Convention is a useful addition to the regulatory regime of the oceans but far from a panacea to NNS issues and AT Parties should continue to proactively address ballast water management issues at the regional level.

3.2.2.5. BEATING THE BARNACLES: MANAGING BIO FOULING

The only internationally binding instrument that identifies the threat of hull fouling, rather than targeting the biosecurity threat, addresses the negative environmental impacts of hull fouling by prohibiting the use of harmful organotins in anti-fouling paints used on ships and prevents the future use of other harmful substances in anti-fouling systems.¹⁷⁸ However, Parties also “undertake the continued development of anti-fouling systems that are effective and environmentally safe.”¹⁷⁹ No specific instruments exist to manage the biosecurity threat posed by bio-fouling.¹⁸⁰ In 2004 the CBD COP identified the issue of bio-fouling as a specific gap in the international regulatory framework and requested that the IMO develop guidelines to deal with the issue.¹⁸¹ The 57th session of the MEPC approved the inclusion of the issue as a high-priority item in the sub-Committee on Bulk Liquids and Gases (‘SC-BLG’) work program.¹⁸² The SC-BLG established a correspondence group to develop Guidelines for the control and management of ships’ bio-fouling to minimise the transfer of invasive aquatic species in 2009, modelled on the Guidelines developed for Ballast Water Management.¹⁸³

Despite this, several limitations impede the development of international rules to address biofouling in the Antarctic area. Unlike other biosecurity threats that are the result of discharge, a fouled

¹⁷⁷ See *Appendix 8: Antarctic Actors Treaty Matrix*.

¹⁷⁸ *International Convention on the Control of Anti-fouling Systems on Ships* opened for signature 5 October 2001, IMO/AFS/CONF/25 (entered into force 17 September 2008) (‘AFS Convention’); for active Antarctic Parties see: *Appendix 8: Antarctic Actors Matrix*.

¹⁷⁹ AFS Convention, Article 1(5).

¹⁸⁰ CBD Review, [79].

¹⁸¹ CBD COP, ‘Alien species that threaten ecosystems, habitats or species (Article 8 (h))’ Decision VII/13 (2004), [7 (b)].

¹⁸² On request of several AT Party member States: New Zealand, Australia, UK, Friends of the Earth International and the IUCN, *Development of international measures for minimizing the translocation of invasive aquatic species through biofouling of ships* MEPC 56/19/3 (2007), [19.11].

¹⁸³ MEPC, *Guidelines for the Control and Management of Ships’ Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens*, Resolution A.868(20); MEPC, *Report of the MEPC Sub-Committee on Bulk Liquids and Gases 12th Session* (2008).

surface poses a biosecurity threat wherever the vessel is in contact with the water column.¹⁸⁴ Roberts and Tsamenyi argue that the Ballast Water Convention or the AFS Convention could be amended to address the risks associated with biofouling.¹⁸⁵ The latter, although providing a certification system, is a very specific convention focussed on reducing the harmful effects of a mitigation measure; the former is a highly technical convention that focusses on a particular biosecurity threat. Neither fit comfortably with the management of bio fouling. To address the biosecurity threat of biofouling, IMO members must adopt new rules.

Creating international regulations for the management of biofouling is a challenging endeavour. Evidence shows that reducing the risks associated with bio fouling through cleaning is costly and requires significant infrastructure to avoid exposing the environment to higher risks.¹⁸⁶ MARPOL 73/78¹⁸⁷ and the Ballast Water Convention¹⁸⁸ require coastal states to ensure the provision of waste reception and treatment facilities for marine pollution and ballast water, but taking into account the obligation not to unduly delay or detain vessels,¹⁸⁹ ensuring material removed is adequately treated might prove onerous for coastal states.¹⁹⁰ However, the development of adequate technologies through the Ballast Water Convention process highlights the value of adopting ambitious targets. Adopting the model of ballast water management would involve interim Guidelines followed by the negotiation of a comprehensive instrument. Although managing ballast water and bio fouling involve considerably different issues, the commonality is the ambitious technical requirements and management developments required before any target standards can be put into effect. The increasing ratification of the Ballast Water Convention and growth of treatment technologies indicates it is a successful model, although entirely consistent implementation has yet to be achieved in the Antarctic area.¹⁹¹ Arguably, a more appropriate intermediary solution is Gateway

¹⁸⁴ J Roberts and M Tsamenyi, 'International legal options for the control of biofouling on international vessels', (2008) 32 *Marine Policy* 559, 560.

¹⁸⁵ *Ibid*, 566-567.

¹⁸⁶ O Floert, *et al*, 'Efficacy of hull cleaning operations in containing biological material: 1. Risk assessment,' MAF Biosecurity New Zealand Technical Paper No 06/12 (2005), 56; See for example: ANZECC, *Code of Practice for Anti-Fouling and In-water Hull Cleaning and Maintenance*, (1997), <http://www.environment.gov.au/coasts/pollution/antifouling/code_pubs/code.pdf> at 19 September 2009]

¹⁸⁷ Article V(1).

¹⁸⁸ Article 5.

¹⁸⁹ UNCLOS, Article 226; Ballast Water Convention, Article 12(1).

¹⁹⁰ Roberts and Tsamenyi, above n 184, 565.

¹⁹¹ COMNAP and IAATO, *The use of Ballast Water in Antarctica*, ATCM XXVIII IP 121 (2005).

ports providing a buffer for the Antarctic, contingent on the development of efficient, cost effective and timely treatment systems. However, regulating the movement of vessels that do not meet requirements will continue to be difficult.¹⁹²

3.2.2.6. MANAGING NNS IN SPECIAL MARINE AREAS

There is little scope outside the ATS for AT Parties to develop biosecurity protection for specific marine areas outside national jurisdiction.¹⁹³ The challenge for the Antarctic area is providing biosecurity protection for marine areas close to shore where biosecurity threats are the highest but would usually come under the ambit of domestic laws and processes.¹⁹⁴ Although coastal states have considerable authority to control the entry of vessels into their internal waters or ports,¹⁹⁵ the customary freedom of navigation and science of the high seas is confirmed in UNCLOS and, by extension, the Antarctic area.¹⁹⁶ However, the freedom is limited by the requirement to preserve and protect the environment, particularly taking measures to protect and preserve rare or fragile ecosystems and the habitat of “depleted, threatened or endangered species and other forms of marine life”,¹⁹⁷ legitimating and obliging Parties to provide for high seas area protection in the stated circumstances.¹⁹⁸ The importance of marine protected areas is confirmed in numerous multilateral treaties¹⁹⁹ and the international community has committed to establishing a representative network of MPAs by 2012.²⁰⁰ The CBD in particular addresses the protection of marine and coastal areas as a thematic issue and promotes marine and coastal protected areas as an essential tool to help conserve and sustain biodiversity in areas beyond national jurisdiction.²⁰¹ The guidelines developed to help scope appropriate areas for protection have particular relevance in the Antarctic area,

¹⁹² See below, section 2.1.4.6.

¹⁹³ H Thiel, ‘Approaches to the Establishment of Protected areas on the High Seas’, in A Kirchner (ed.), *International Marine Environmental Law* (2003).

¹⁹⁴ P N Lewis, M J Riddle and S D A Smith, ‘Assisted passage or passive drift: a comparison of alternative transport mechanisms for non-indigenous coastal species into the Southern Ocean’ (2005), 17(2) *Antarctic Science* 183, 189.

¹⁹⁵ Johnson, above n 120, 10.

¹⁹⁶ UNCLOS, Article 87.

¹⁹⁷ UNCLOS, Article 194(5).

¹⁹⁸ E J Molenaar and A G O Elferink, ‘Marine protected areas in areas beyond national jurisdiction: the pioneering efforts under the OSPAR Convention,’ (2009), 5(1) *Utrecht Law Review* 5, 12.

¹⁹⁹ For a survey, see T Scovazzi, ‘Marine Protected Areas on the High Seas: Some Legal and Policy Considerations’, (2004) 19(1) *The International Journal of Marine and Coastal Law* 1, 8-9.

²⁰⁰ Plan of Implementation of the World Summit on Sustainable Development (Johannesburg, 4 September 2002). [32(c)].

²⁰¹ CBD COP, *Protected areas* Decision VIII/24 (2006), [35-47].

including specifically identifying ice covered areas.²⁰² Moreover, the CBD programme of work on marine and coastal protection addresses the risk of NNS introduction as a specific threat.²⁰³ However, the open working group set up to address the issue through the UN General Assembly has yet to determine how MPAs can be established and managed in areas beyond national jurisdiction.²⁰⁴

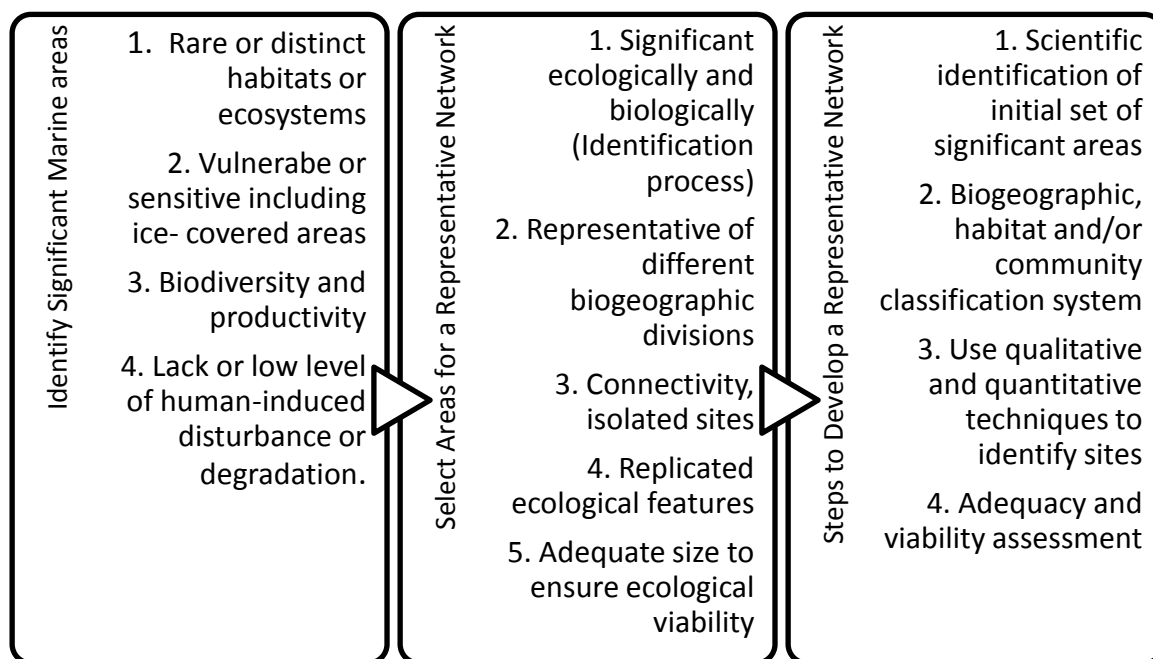


FIGURE 3.2: CBD GUIDANCE ON ESTABLISHING NETWORKS OF MPAS BEYOND NATIONAL JURISDICTION RELEVANT TO THE ANTARCTIC AREA²⁰⁵

There are few mechanisms that provide for applying practical biosecurity measures to designated MPAs beyond national jurisdiction. As discussed in Chapter Two, the UN provides for the identification of vulnerable marine ecosystems in the benthic environment that can be protected by limiting interaction with the areas through bottom trawling.²⁰⁶ However, protecting coastal and

²⁰² CBD COP, *Marine and coastal biodiversity* Decision IX/20 (2008) Appendixes 1-3.

²⁰³ CBD COP, *Marine and coastal biological diversity* Decision VII/5 (2004), Annex I [5].

²⁰⁴ UNGA, *Report of the Ad Hoc Open ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction* Doc. A/61/65 (2006).

²⁰⁵ Adapted from CBD COP, *Marine and coastal biodiversity* Decision IX/20 (2008) Appendixes 1-3, Decision IX/20, Annex 1-3.

²⁰⁶ United Nations General Assembly *Resolution 61/105* (2006), OP83.

open water areas from biosecurity threats requires limiting discharge and ship traffic in the area. Both MARPOL 73/78 and the Ballast Water Convention allow Parties to apply special protection to special areas by effectively limiting discharge. However, there are no Special Area provisions for Annex IV of MARPOL 73/78 and as indicated above, Annex V does not target biosecurity threats.²⁰⁷ Article 211(6) of UNCLOS permits a coastal state to adopt special measures relating to vessel-source pollution within “clearly defined areas of their EEZ”, subject to the approval of the IMO but Article 211(6) of UNCLOS does not apply to ballast water²⁰⁸ and requires jurisdiction stemming from territorial jurisdiction over the area protected. In addition, although there is nothing prohibiting the extension of additional measures to the Antarctic area through Article 2(3) of the Ballast Water Convention, there is no specific provision or mechanisms to provide for areas beyond national jurisdiction.²⁰⁹ The additional measures must be consistent with international law,²¹⁰ take into account IMO guidelines²¹¹ be adopted after consultation with other affected States, communicated to the IMO²¹² and, “to the extent required by customary international law as reflected in [UNCLOS], as appropriate, obtain the approval of the Organisation”.²¹³ The extent this permits AT Parties to take unilateral action to provide more stringent ballast water standards in regards to the Southern Ocean is unclear. The guidelines do not offer much further elaboration, stating Parties must provide a “legal determination” for the standard.²¹⁴ The only reference to IMO approval in UNCLOS permits a coastal state to adopt special rules and standards relating to vessel-source pollution in respect of a clearly defined area of their EEZ, in circumstances where the international standards are inadequate due to special oceanographic or ecological conditions existing therein.²¹⁵ As ballast water is arguably not “pollution” under UNCLOS,²¹⁶ there no provision exists for Parties to seek IMO approval in respect of

²⁰⁷ See above, Chapter 2, Section 2.2.1.4.

²⁰⁸ Applying to marine pollution, not NNS; See above section 2.1.4.1.; C.f. Parties were divided on this point in the negotiation of the Guidelines; United States, *Comments on the Draft Guidelines for additional measures regarding ballast water management including emergency situations (G13)*, BLG 11/4/12, (2007) [4].

²⁰⁹ Scott, above n 116, 318-319.

²¹⁰ Ballast Water Convention, Article 2(3), Annex Regulation C-1.1.

²¹¹ Ibid, Regulation C-1 3.2.1; MEPC, Guidelines for Additional Measures Regarding Ballast Water Management Including Emergency Situations ('G13') IMO Resolution MEPC. 161(56) (2007).

²¹² Ballast Water Convention, Regulation C-1, 3.2.2.

²¹³ Ibid, 3.2.3.

²¹⁴ G13, 2.3.3.

²¹⁵ UNCLOS, Article 211(6).

²¹⁶ See above Section 3.2.2.1.

these additional requirements.²¹⁷ On one hand, AT Parties are in an ideal position to provide for additional and more stringent measures in the area. PEPAT's implicit duty to take into account the introduction of NNS in the AT area provides AT Parties with the legal determination to adopt a more stringent standard.²¹⁸ However, the limited acceptance of the ATS means AT Parties are unlikely to have the legal competence to provide for the protection of the Antarctic high seas outside the ATS.²¹⁹ The IMO is the more appropriate route for special measures, although the Ballast Water Convention does not create any procedure for providing additional discharge standards in areas beyond national jurisdiction through the IMO.

The IMO provides guidelines for designating areas as "Particularly Sensitive Sea Areas" ('PSSA') within and beyond the limits of the territorial sea that offer the potential for invoking additional measures under Article 2(3) of the Ballast Water Convention.²²⁰ The designation of a PSSA allows the IMO to "narrowly tailor" area protection measures to target identified vulnerabilities. However, despite the scope within the guidelines for designating PSSAs in high sea areas,²²¹ the guidelines do not provide any procedure to do so. Governments with "a common interest" may issue a joint submission of PSSA proposals but "the proposal should contain integrated measures and procedures for cooperation between the jurisdictions of the proposing member governments" implying an area is within the jurisdiction of two or more states, not outside national jurisdiction.²²² Nevertheless the criteria for designating a PSSA share commonalities with a number of ATS documents in evoking the conditions of the Antarctic area.²²³

²¹⁷ Scott, above n 116.

²¹⁸ MEPC, *Guidelines for Ballast Water Exchange in the Antarctic Treaty Area*, Resolution MEPC.163(56) (2007); see Chapter 2, Section 2.1.5.

²¹⁹ M J Kachel, *Particularly sensitive sea areas: the IMO's role in protecting vulnerable environments* (D Phil Thesis, University of Hamburg, 2008) 126-127.

²²⁰ MEPC, *Revised Guidelines for the Identification and Designation of PSSAs* Resolution A.982(24) XXIV IMO (2005), 4, 3.

²²¹ The term "within and beyond the limits of the terrestrial sea" implying a potential scope on the EEZ and beyond; K M Gjerde, 'Protecting Particularly Sensitive Sea Areas: A Review of IMO's New PSSA Guidelines,' in H Thiel and A Koslow (eds.) *Managing Risks to Biodiversity and the Environment on the High Sea, Including Tools Such as Marine Protected Areas – Scientific Requirements and Legal Aspects* (2001), 124; Kachel, above n 219, 281-285.

²²² Gjerde, *ibid*, 127.

²²³ The representativeness of the area's biogeography, habitat or ecosystem, the importance of the area to local ecosystems' life history, and the degree of interference already practiced; United Kingdom, *Criteria for the selection of Marine Protected Areas* ATCM XXX IP 53 (2007), 3-4; CBD COP, *Scientific Criteria for Identifying Ecologically or Biologically Significant Marine Areas in Need of Protection in Open-Ocean Waters and Deep-Sea Habitats*, Annex to Decision IX/20 (2008); ATCM, *Guidelines for the implementation of the framework of protected areas set forth in Article 3, Annex V of the Environmental Protocol* ATCM XXII Resolution 1 (2000); *The work of CCAMLR on MPA* ATCM XXIX (2006). Working Paper 7

However, the designation has no legal significance in itself, rather providing for associated protective measures in the text of the adopting instrument.²²⁴ This can include measures already available under an existing IMO instrument²²⁵ or measures that should exist and fall within the competence of the IMO, requiring the adoption of a new instrument to apply the measure. APMs identified by the PSSA Guidelines relevant to biosecurity include provisions already applied to the Antarctic area; being designated as a special area under the Annexes of MARPOL 73/78. Other relevant areas include ships' routing measures that could limit access to certain ecologically sensitive areas, reporting measures that would be required to promote compliance, buffer zones and "control of ballast water discharges".²²⁶ Routing measures include designation of "areas to be avoided" which are usually used to prevent possible grounding of tankers and other ships carrying hazardous cargo in environmentally sensitive areas.²²⁷ The implementation of routing measures in ecologically sensitive areas is particularly useful for reducing the risks from bio fouling, where grounding poses a particular risk of introduction.²²⁸ These provisions are justified under the *International Convention on the Safety of Life At Sea 1974*,²²⁹ which although originally focussing on ship safety, now has a wider ambit including environmental protection.²³⁰ The purpose of the designation according to the relevant guidelines is to prevent pollution and they have been implemented widely in PSSAs.²³¹

(Attachment: Report of the CCAMLR Workshop on MPA); MEPC, *Revised Guidelines for the Identification and Designation of PSSAs* Resolution A.982(24) XXIV IMO (2005) ('PSSA Guidelines'); c.f. "...the PSSA criteria have been so broadly formulated that a case could be made for almost any area". E J Molenaar, *Coastal state jurisdiction over vessel-source pollution* (1998), 439.

²²⁴ Ibid, 125.

²²⁵ See Table 3.2 below.

²²⁶ PSSA Guidelines, [3.1.3-3.1.5].

²²⁷ N Bowditch, 'The American Practical Navigator: An Epitome of Navigation,' (1995) *National Ocean Service, Pub. No 9*, 392.

²²⁸ J Roberts, 'Protecting sensitive marine environments: the role and application of ships' routing measures' (2005) 20 *International Journal of Marine and Coastal Law* 135; Roberts and Tsamenyi, above n 185, 566.

²²⁹ *International Convention for the Safety of Life at Sea*, opened for signature 1 November 1974 as amended. 1184 *United Nations Treaty Series* 278 (entered into force 25 May 1980) ('SOLAS'); widely implemented among Antarctic actors: *Appendix 8: Antarctic Actors Treaty Database*.

²³⁰ Roberts, above n 228, 141; See for example: SOLAS, *Ships Routing*, Regulation SOLAS V/10(1).

²³¹ See for example: MEPC, *Designation of the Canary Islands as a Particularly Sensitive Sea Area* MEPC.134(53) (2005).

TABLE 3.2: ASSOCIATED PROTECTED MEASURES USED IN PSSAS UNDER THE IMO

Associated Protected Measure	IMO Instrument	Utility in PSSAs (11 total) ²³²
Areas to be avoided	General Provisions on Ships Routeing Resolution A.572(14), as amended	72% (8)
Mandatory no anchoring areas	General Provisions on Ships Routeing Resolution A.572(14), as amended	9% (1)
Mandatory/Recommended routes	General Provisions on Ships Routeing Resolution A.572(14), as amended	4(6)
Mandatory/recommended ship reporting	General Provisions on Ships Routeing Resolution A.572(14), as amended	54%(6)
MARPOL 73/78 Special Area	MARPOL 73/78 under Annex I, II, V	9% (1)

The development of a mandatory polar code arguably makes designation as a PSSA redundant. Some commentators maintain the only utility of the PSSA concept is its symbolic quality, encouraging ship Masters to take additional precautions and thus reduce the possibility of pollution.²³³ Practically, the additional protective measures require IMO approval for adoption,²³⁴ thus removing the potential for AT Parties acting unilaterally to protect the Antarctic area. The introduction of the mandatory polar code allows AT Parties and the IMO to provide for employing all the additional protective measures available without designation as a PSSA. However, designation as a PSSA means as additional measures under the IMO are developed, so will the protection afforded the Antarctic marine area.²³⁵ The current development of measures to reduce the risks of biofouling highlights the importance of maintaining the strong linkages between the IMO and ATS.²³⁶ Ensuring compliance is a considerable limitation of the effect of the designation of any marine protected area on the high seas.²³⁷ Although the PSSA Guidelines oblige IMO member States to use specific compliance measures,²³⁸ enforcing rules on Parties outside the ATS remains difficult in high seas areas.²³⁹

²³² Up to March 2010; See Australian Maritime Safety Authority, *PSSA Fact Sheet*, (2009) Table 1-Designated PSSAs, <http://www.amsa.gov.au/publications/fact_sheets/psa_fact.pdf> at 1 March 2010.

²³³ L M Warren and M W Wallace, 'The Donaldson Inquiry and its Relevance to Particularly Sensitive Sea Areas', (1994) 9 *International Journal of Maritime and Coastal Law* 528.

²³⁴ Molenaar, above n 223, 442; Roberts, above n 228, 157.

²³⁵ Kachel, above n 219, 282.

²³⁶ Also promoted by AT Parties; Chair's Report of Antarctic Treaty Meeting of Experts on Ship Borne Tourism in the Antarctic Treaty Area (2009), Recommendation 15.

²³⁷ PSSA Guidelines, 9.3.

²³⁸ Molenaar, above n 223, 442.

²³⁹ Kachel, above n 219, 281-3.

3.2.2.7. COMPLIANCE IN THE WATER: LIMITATIONS OF THE FLAG STATE

The sovereign immunity provisions in UNCLOS, MARPOL 73/78 and the Ballast Water Convention mean that most of the scientific support vessels in the Southern Ocean on government non-commercial service are not obliged to follow any of the discharge standards, irrespective of compliance measures imposed.²⁴⁰ The biosecurity risks posed by scientific vessels can only be adequately addressed by international law if exceptions to the sovereign immunity provisions in the law of the sea are developed. That significant limitation aside, the flag state is responsible for enforcing appropriate jurisdiction and control on the high seas.²⁴¹ Outside the specific offences of piracy, slavery, unauthorised broadcasting²⁴² and rules regarding hot pursuit,²⁴³ foreign warships on the high seas can only board ships they suspect of being a “ship without nationality”²⁴⁴ or a ship that is in reality the same nationality as the warship, irrespective of the flag.²⁴⁵ Moreover, the flag state is an increasingly inadequate regulatory mechanism,²⁴⁶ with a considerable number of ship owners operating in the Antarctic area flagged to open registries or “flags of convenience”.²⁴⁷ The inspection provisions of the AT and PEPAT only permit inspections of vessels “at points of discharging or embarking cargoes or personnel in Antarctica”.²⁴⁸ Moreover, the prohibitive size and cost of enforcement action in the Southern Ocean limits functional utility of any inspection regimes,

²⁴⁰ T L McDorman, ‘Port State Enforcement: A Comment on Article 218 of the 1982 Law of the Sea Convention,’ (1997), 28 *Journal of Maritime Law and Commerce* 305, 309.

²⁴¹ UNCLOS, Article 92(1).

²⁴² UNCLOS, Article 110(1).

²⁴³ UNCLOS, Article 111.

²⁴⁴ A ship that sails under the flags of two or more States, “using them according to convenience” may not claim any of the nationalities and may be assimilated to a ship without nationality. UNCLOS Article 92(2).

²⁴⁵ UNCLOS, Article 110; S Kaye, ‘Threats from the Global Commons: Problems of Jurisdiction and Enforcement,’ (2007) 8 *Melbourne Journal of International Law* 186; R G Rayfuse, *Non-flag state enforcement in high seas fisheries*, (2004) 56-57.

²⁴⁶ F Plaza, ‘The Future for Flag State Implementation and Port State Control’ in Centre for Oceans Law and Policy, *Current Maritime Issues and the International Maritime Organisation* (1999), 201.

²⁴⁷ A “flag of convenience” or “open register” requires minimal links with the vessels and generally do not possess the capacity to exercise effective control over the vessels: D Freestone and S M A Salman, ‘Ocean and Freshwater Resources’ in D Bodansky, J Brunnee, E Hey, *The Oxford Handbook of International Law* (2008), 343.

²⁴⁸ See AT, Article VII, PEPAT, Article 14(3); See above, *Chapter 2, Section 2.2.2.2.*

especially as ship traffic grows in the area.²⁴⁹ In addition, post-entry inspection can identify potential biosecurity threats but do little to minimise them; a fouled hull will remain a risk irrespective of the negative report of an inspector. Article 13 of PEPAT provides for States to take appropriate measures within their jurisdiction to enforce compliance with the protection of the Antarctic environment, permitting unilateral action to a certain point. The possibility of enforcing port state control will be discussed in relation to the two activities of relevance in the Antarctic area: tourism and fishing.

3.2.2.8 BIOSECURITY OF THE SOUTHERN OCEAN SUMMARY

The biosecurity threats to the global marine environment are addressed in a fragmented and inconsistent manner. The broad requirement to take biosecurity measures in Article 196(1) of UNCLOS is only specifically elaborated by the Ballast Water Convention, promoting significant but limited action to reduce the risks of spreading NNS through ballast water discharge. UNCLOS and MARPOL 73/78 contain indirect limitations on sewage and garbage discharges from land and ships but do not strategically identify or mitigate the biosecurity threat posed by these discharges. Moreover, although a number of regimes recommend the protection of marine areas, few instruments offer concrete tools to protect the areas that are relevant to biosecurity threats.

3.2.3 SUMMARY OF INTERNATIONAL BIOSECURITY PROVISIONS RELEVANT TO NAPs

There is a wide range of international and regional instruments that reference NNS, but only a few have specific application to science in the Antarctic area.²⁵⁰ With the limited scope of activity on the Antarctic continent and islands, and significant protection already afforded the Antarctic terrestrial environment, the main utility of the provisions for an Antarctic biosecurity regime is in substantive biosecurity guidance and protection for the marine environment. The CBD CMS framework and area-protection conventions offer a range of guidelines and reporting measures to assist implementation of PEPAT provisions. The general acceptance of the CBD is tempered by its limited provisions, although this is assisted by the reporting process that provides an indication of the healthy levels of implementation among AT Parties. Although only the CBD and ACAP can be arguably applicable in the Antarctic context, all provide a clear duty to take into account the harmful impacts of NNS on

²⁴⁹ ASOC, *Port State Control: An Update on International Law Approaches to Regulate Vessels Engaged in Antarctic Non-Governmental Activities* ATCM XXVI IP 44 (2003).

²⁵⁰ See Shine, above n 5, Appendix I.

Antarctic biodiversity and urge a precautionary approach to activities that might risk NNS introduction. In the marine environment, the IMO's Ballast Water Convention, once in force, will empower AT Parties to create a significant barrier for introductions of NNS in the Antarctic area through ballast water. The development of biofouling guidelines through the IMO will create the opportunity for AT Parties to further safeguard scientific activities from being responsible for introducing NNS. Whether the provisions of the above conventions apply to third parties has more reference to the tourism and fishing industries as discussed below.

3.3. ANTARCTIC TOURISM AND INTERNATIONAL BIOSECURITY

The regional approach to the regulation of tourism does not adequately address the specific biosecurity risks posed by tourist vessels in the Antarctic area.²⁵¹ Half of the IAATO members' ships not registered to AT Parties are outside the ambit of the ATS.²⁵² However, ship-borne tourism in the Antarctic²⁵³ is subject to the law of the sea associated with Antarctic marine areas.²⁵⁴ Unfortunately, all of the vessels outside the ambit of the ATS are flagged to States that are open registry with the considerable issues associated with flags of convenience. As part of the Commission on Sustainable Development's international work programme on sustainable tourism development, the CBD addresses tourism as a cross cutting issue threatening biodiversity, although provides very little elaboration on how States should minimise risks from tourist vessels.²⁵⁵ Thirteen of the 20 known flag states of tourist vessels submitted Third National Reports to the CBD, five of which are non-Parties to the AT.²⁵⁶ The reports indicate that non-Parties do not adequately address the risks posed to biodiversity by the tourist industry²⁵⁷ and have not implemented biosecurity measures as

²⁵¹ S V Scott. 'How Cautious is Precautious? Antarctic Tourism and the Precautionary Principle,' 50(4) (2001) *The International and Comparative Law Quarterly* 971.

²⁵² See Figure 3.2 below.

²⁵³ For the 2008-2009 season, 41998 of the 42964 passengers from IAATO Members were based on seaborne tourism. IAATO, *IAATO Overview of Antarctic Tourism: 2008-2009 Antarctic Season and Preliminary Estimates for 2009-2010 Antarctic Season*, ATCM XXXII IP 86 rev 1 (2009), 13.

²⁵⁴ See above Section 3.2.3.4.

²⁵⁵ Executive Secretary of the CBD, *Biological Diversity and Tourism: Development of Guidelines for Sustainable Tourism in Vulnerable Ecosystems* (2002), 1.

²⁵⁶ Antigua and Barbuda, Australia, Bahamas, Barbados, Chile, France, Germany, Liberia, Netherlands, Norway, Panama, Spain and UK; CBD National Reports Analyser.

²⁵⁷ Although eight of the 13 report "establishing mechanisms to assess, monitor and measure the impact of tourism on biodiversity", three of the States which have done nothing are non-Parties to the AT and authorised over 30% of all tourist

comprehensively as the AT Parties.²⁵⁸ However, the considerable discretion available under UNCLOS to Antarctic gateway ports offers scope for implementing port state control measures to limit the biosecurity threats of tourism.

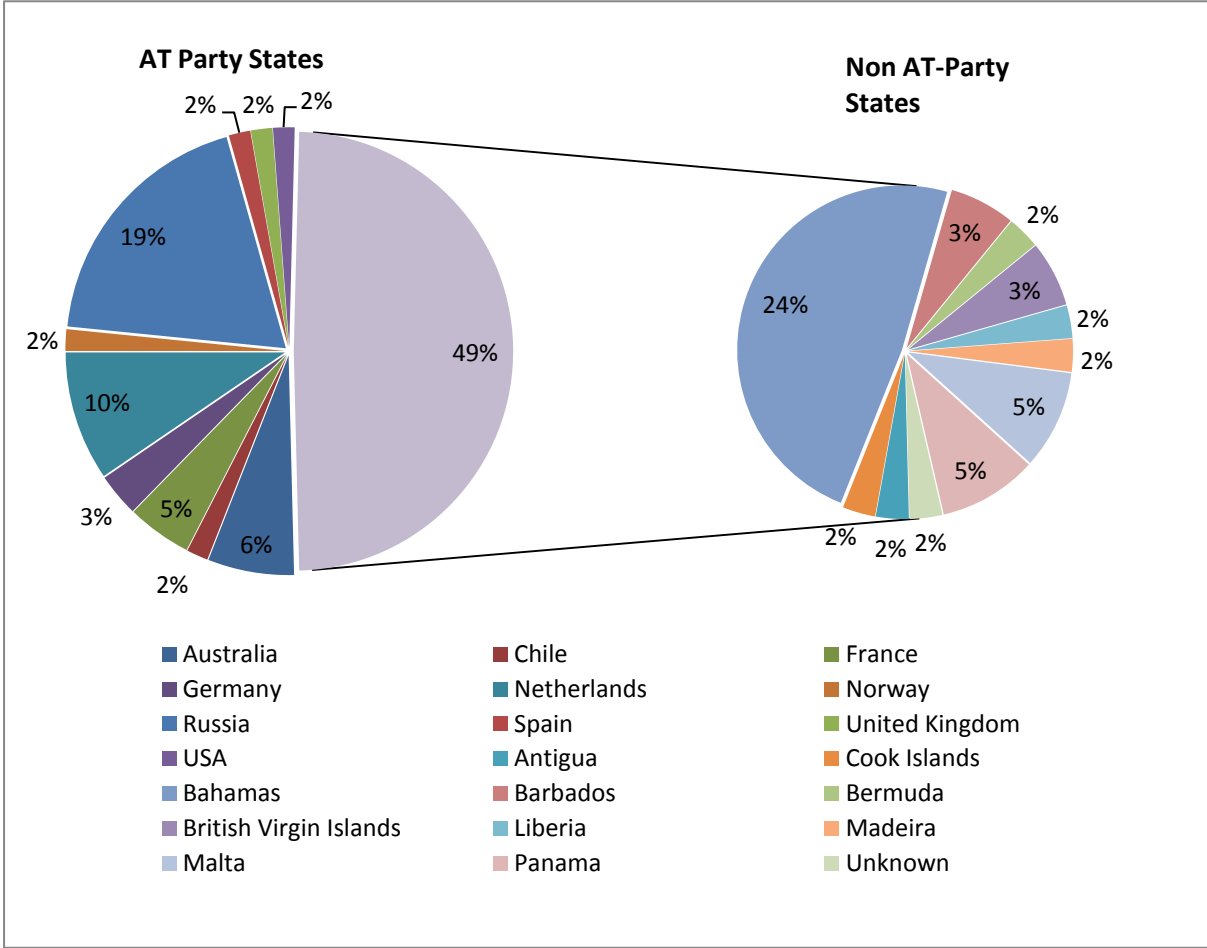


FIGURE 3.3: REGISTRY OF IAATO MEMBERS DURING THE 2008/9 SEASON²⁵⁹

activity in the 2008-9 season. (Antigua and Barbuda, Bahamas and Liberia; the other non-AT parties are either non-parties to the CBD or did not submit information relevant to tourism, suggesting non-compliance.)

²⁵⁸ Of the five non-Party States with tourist vessels operating in the Antarctic area that have submitted Third Reports to the CBD, only two have ratified the Ballast Water Convention, although three report some measures taken to control ballast water and two have taken measures to reduce risks from hull fouling. In addition, compared with AT Parties, the five non-Party states have significantly lower reported implementation of the measures relevant to alien species in the CBD. Averaging 33% compared with the 57% of AT Parties, the ratification of the Interim Guidelines and Guidelines show an even larger gap; 45% to 74% and 30% to 4% respectively; See Appendix 4: Tourism Statistic Analysis.

²⁵⁹ Based on IAATO, IAATO Overview of Antarctic Tourism 2008-2009 Antarctic Season and Preliminary Estimates for 2009-2010 Antarctic Season, ATCM XXXII IP 86 rev 2 (2009).

3.3.1 GLOBAL GUIDELINES FOR SUSTAINABLE TOURISM

Despite the rapid global growth of the tourist industry, very few instruments contain specific measures for managing the impacts of tourists introducing NNS into the environment.²⁶⁰ As both cross-cut the issue, NNS and tourism are discussed concurrently in the Tourism Guidelines provided by the CBD COP.²⁶¹ These complement the ATS and IAATO, providing AT Parties and the industry with guidance on how to incorporate biosecurity considerations into tourist management regimes. The Guidelines specifically refer to the increased risk of introducing alien species or pathogens as an “impact of tourism” that should be taken into account when assessing individual tourist projects and the strategic vision for tourism as a whole.²⁶² The Guidelines require the risks to be managed appropriately, “[p]reventing the introduction of alien species the construction, landscaping and operating of tourism activities, including for example from shipping associated with tourism.”²⁶³ They also encourage appropriate management of other risky activities in the context of NNS, including waste,²⁶⁴ pollution, and “promoting appropriate behaviour by tourists so as to minimize their adverse impacts.”²⁶⁵ The adaptive management approach, essential to ensuring objectives and adjusted to meet the target of the overall vision in line with impact studies, is lacking in both the ATS Framework and IAATO’s self regulation.²⁶⁶

²⁶⁰ See for example: World Tourism Organisation, *Global Code of Ethics for Tourism*, (2004), Article 3(4). <http://www.unwto.org/ethics/full_text/en/pdf/Codigo_Etico_Ing.pdf> at 20 September 2009 (the main focus throughout the guidelines is minimising impacts on indigenous communities).

²⁶¹ CBD COP, *Guidelines on Biodiversity and Tourism Development* Decision V/25, Annex (2000) (‘CBD Tourism Guidelines’); CBD COP, *Biological Diversity and Tourism* Decision VII/14 (2004) [10, 49,71]; R Tapper (ed.), *User’s Manual on the CBD Guidelines on Biodiversity and Tourism Development*, (2007) <<http://www.cbd.int/doc/programmes/tourism/tourism-manual-en.pdf>> at 21 September 2009.

²⁶² CBD Tourism Guidelines, B(5)(34)-(35).

²⁶³ Ibid, B(6)(49)(g).

²⁶⁴ Ibid, B(6)(49)(d).

²⁶⁵ Ibid, B(6)(49)(k).

²⁶⁶ See Figure 3.4.

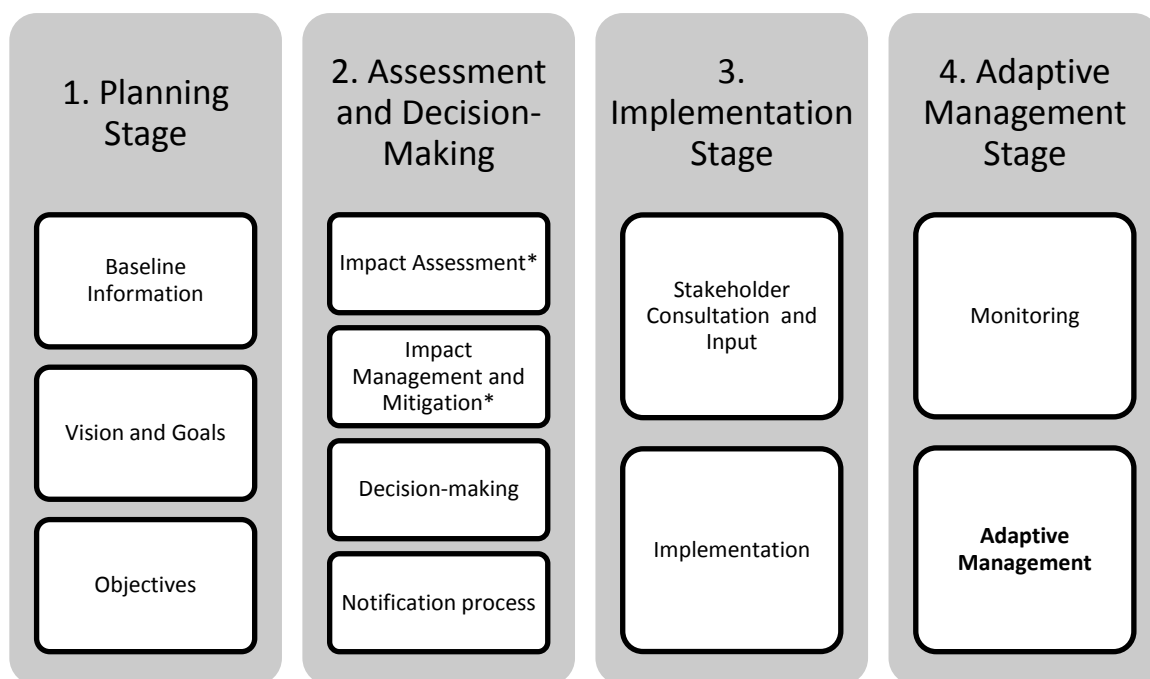


FIGURE 3.4: POLICY, PLANNING AND MANAGEMENT PROCESSES IN CBD TOURISM GUIDELINES²⁶⁷

The Guidelines make reference to the “limits of acceptable change”²⁶⁸ and “recreational opportunity spectrum”²⁶⁹ planning methodologies, both of which focus on compromise between management goals and recreational experiences, arguably inappropriate in the Antarctic context where the comprehensive protection of the environment and inherent values are the priority. However, based on the methodologies, in vulnerable ecosystems tourist activity can be restricted or prevented altogether.²⁷⁰ Where appropriate, this could provide legitimacy for restricting access to areas or particular activities. The potential breach of WTO fair trade practices has been identified as a potential barrier in the way of restricting activities, but the SPS agreement allows for biosecurity

²⁶⁷ *CBD Tourism Guidelines specifically provide for the consideration of NNS at this stage; Adapted from Tapper, above n 261, 9.

²⁶⁸ See T A Farrell and J L Marion, ‘The Protected Area Visitor Impact Management (PAVIM) Framework: A Simplified Process for Making Management Decisions,’ (2002) 10 *Journal of Sustainable Tourism* 1.

²⁶⁹ See R N Clark and G H Stankley, ‘The Recreation Opportunity Spectrum: A Framework for Planning, Management and Research’, (1979) *General Technical Report PNW-98*: <http://72.41.119.75/Library/Visitor_Experience_Management/Recreation_Opportunity_Spectrum_1979.pdf> at 21 September 2009.

²⁷⁰ CBD Tourism Guidelines, B(6)(46).

measures as long as they are the least trade restrictive possible, transparent and consistent.²⁷¹ One potential way for AT Parties to implement the integrated tourist management regime on the significant number of non-Party vessels is by Antarctic Gateway ports implementing port state control.

3.3.2. DEVELOPING NON-PARTY COMPLIANCE: PORT STATE CONTROL

Customary international law acknowledges the wide discretion available to States in exercising jurisdiction over its ports²⁷² and a number of binding and non-binding measures exist in international law that makes use of the discretion. There is no general right to enter a port.²⁷³ In principle, there is also no objection to a State requiring a ship to mitigate biosecurity threats before departing from a port as a condition for entry.²⁷⁴ However, exercising port state jurisdiction still needs sufficient jurisdictional basis to allow States to enforce any measures.²⁷⁵ Enforcement must be justified on legislation based on international law²⁷⁶ and often, although a port state has the discretion to refuse vessels services,²⁷⁷ it cannot enforce punitive measures.²⁷⁸ UNCLOS authorises port states to institute proceedings, where the evidence so warrants, with respect to illegal discharges occurring beyond its maritime zones.²⁷⁹ However, these proceedings only apply to breaches of “applicable international law and standards established through the competent international organisation or general diplomatic conference”.²⁸⁰ Although Article 13 of PEPAT essentially gives AT Parties unlimited potential to enact enforcement measures, enforcing third parties essentially offends

²⁷¹ See ASOC, *What does Regulation of Commercial Tourism mean?* ATME on Tourism and Non-Governmental Activities in Antarctica IP 20 (2004) [7]; in response to United Kingdom, *Proposals to improve the management and regulation of Antarctic tourism*, ATCM XXVI WP 23 (2003).

²⁷² *Case concerning Military and Paramilitary Activities In and Against Nicaragua (Nicaragua v United States of America)*, [1986] 111 International Court of Justice Reports [123]; the right to navigation within the territorial sea must not be prejudicial to “the peace, good order or security of the coastal state,” UNCLOS, Articles 19(1).

²⁷³ With the exception of a force majeure situation, Molenaar, above n 223, 101.

²⁷⁴ E J Molenaar, ‘Port State Jurisdiction: Towards Comprehensive, Mandatory and Global Coverage’ (2007) 38 *Ocean Development and International Law* 225, 241; F O Vicuña, ‘Port State Jurisdiction in Antarctica’, in D Vidas (ed.) *Implementing the Environmental Protection Regime for the Antarctic* (2000), 68.

²⁷⁵ Molenaar, *ibid*, 235-236.

²⁷⁶ O Schachter, *International Law in Theory and Practice*, (1991), 257.

²⁷⁷ For example: access to the port, transfer of cargo, prohibiting use of port services, refusing use of discharge facilities: Molenaar, above n 274, 235.

²⁷⁸ For example: boarding, inspecting or detaining the ship: Molenaar, above n 274, 235.

²⁷⁹ UNCLOS, Article 218(1).

²⁸⁰ *Ibid*.

against the rule of *pacta tertiis*.²⁸¹ In consequence, the extent to which a State can use the principle to protect the Antarctic environment from biosecurity threats is somewhat limited. Under MARPOL 73/78 there is limited scope for port state inspection of certificates and prosecution of violations²⁸² and the pollution provisions allow States to apply Article 218 of UNCLOS to sewage and garbage discharge. However, there are no rules regarding ballast water and bio fouling in force. In addition, UNCLOS significantly limits the States capacity to enforce measures on a foreign vessel, including permitting flag states to pre-empt detention proceedings.²⁸³ Arguably, where ships do not use ports, coastal state jurisdiction could be utilised to enforce ATS principles but the exercise of enforcement in the EEZ is even more limited.²⁸⁴ Nevertheless, Molenaar argues that these provisions simply reflect the progressive development of international law and do not limit the port state's prescriptive and enforcement powers.²⁸⁵ Where a discharge standard proposed by a port state is more stringent than generally accepted and the states do not agree on enforcement, the port state is unlikely to justify criminal or administrative proceedings under UNCLOS.²⁸⁶ However, the state may still restrict port services, which in the case of Antarctic Gateway ports could have a significant impact on tourist activity in the area.

The Ballast Water Convention puts an onus on port state inspection as an important compliance mechanism.²⁸⁷ Once it is in force, it will significantly extend the potential for the Antarctic gateway ports to act as a buffer to ballast water. Although limited by the customary need to avoid undue delay,²⁸⁸ it permits an inspection regime and introduces mandatory requirements and enforcement where threats are found. Once a ship enters a port, port state inspectors may carry out a physical inspection including ballast water sampling,²⁸⁹ and verification of the ships certification and

²⁸¹ See above Section 2.1.1.

²⁸² MARPOL 73/78, Article 5(2)-(3) and 6(2)-(5); see L C Sahatjian, 'MARPOL – an Adequate Regime? A Questioning look at Port and Coastal State Enforcement', (Paper presented at the International Oil Spill Conference 1998), 3-4.

²⁸³ UNCLOS, Article 228(1) (unless the proceedings relate to a case of major damage to the coastal state or the flag state in question has repeatedly disregarded its obligation to enforce international rules in connection with vessel discharges), see also Articles 226, 230, 231 and 292.

²⁸⁴ UNCLOS, Article 220(5)-(6).

²⁸⁵ Molenaar, above n 274, 236; McDorman, above n 240, 307 and 320-322.

²⁸⁶ Molenaar, above n 272, 235-236; a contention supported by state practice in New Zealand; *Sellers v Maritime Safety Inspector*, Case no. CA104/98, Judgement of 5 November 1998, see 5 and 17.

²⁸⁷ Scott, above n 116, 323.

²⁸⁸ Ballast Water Convention, Article 12.

²⁸⁹ There are still significant technical difficulties with sampling ballast water effectively; Gollasch, above n 166, 589.

records.²⁹⁰ If sampling indicates a biosecurity threat,²⁹¹ the port state must prohibit the ship from discharging ballast water.²⁹² Where there is evidence that Master and crew are not aware of or have not implemented ballast water management practices²⁹³ or certification is invalid, the port state may carry out a detailed inspection and take steps to ensure the ship does not discharge ballast water until the ballast water does not pose a biosecurity threat.²⁹⁴ Although flag states are responsible for sanctions, Article 10(2) permits port states to “take steps, warn, detail or exclude a ship in violation of the Convention,”²⁹⁵ a significant development from UNCLOS. In addition, unlike UNCLOS, a flag state cannot pre-empt detention proceedings. The IMO is in the process of developing guidelines for the implementation of the port state control requirements in the Ballast Water Convention which should provide some elaboration on the extent of the sanctions and the potential overlap with UNCLOS.²⁹⁶

Although AT Parties were initially hesitant,²⁹⁷ the ATME on Ship Borne Tourism recommends the implementation of port state control in regard to tourist vessels in the Antarctic area.²⁹⁸ However, short of adopting a new instrument or a memorandum of understanding on port state control in the Antarctic and until the Ballast Water Convention comes into force, very little permits Antarctic gateway States to take additional port state measures to reduce biosecurity threats beyond refusal of service.²⁹⁹ Non-binding regional Memorandum of Understanding (‘MOU’) on port state control provides for a worldwide network exchanging information for the purpose of targeting substandard ships.³⁰⁰ The Southern Ocean is one of the only remaining gaps in the interconnected instruments.³⁰¹

²⁹⁰ Article 9(1)(a)-(c) Ballast Water Convention.

²⁹¹ In the context of the Ballast Water Convention, “a threat to the environment, human health or property” Article 10(3).

²⁹² Ibid.

²⁹³ Including evidence from another party; Ballast Water Convention, Article 10(4).

²⁹⁴ Ballast Water Convention, Article 9(3).

²⁹⁵ Ballast Water Convention, Article 10(2).

²⁹⁶ If ballast water is designated marine pollution under UNCLOS and subject to the enforcement provisions.

²⁹⁷ F O Vicuña, above n 272, 64-5.

²⁹⁸ *Chair’s Report of Antarctic Treaty Meeting of Experts on Ship Borne Tourism in the Antarctic Treaty Area* (2009), Recommendation 6; see also The Netherlands, *Inspection of Ships in Gateway Ports to Antarctica*, on the basis of MARPOL 73/78, and in Antarctic Ports under the Environmental Protocol (Annex IV) to the Antarctic Treaty, ATCM XX WP 9 (1996); United Kingdom, *Enhancing Compliance with the Protocol: Departure state Jurisdiction*, XXI ATCM WP 22 (1997); ASOC, above n 247.

²⁹⁹ ASOC, Ibid.

³⁰⁰ F Plaza, ‘The Future for Flag State Implementation and Port State Control’ in Center for Oceans Law and Policy, *Current Maritime Issues and the International Maritime Organisation* (1999), 209; the European Community, *Council Directive 95/21/EC of 19 June 1995 concerning the enforcement, in respect of shipping using Community ports and sailing in the*

A similar agreement between all States with ships operating in the Antarctic area could provide the legal basis for more extensive port state measures, including those providing for biosecurity.³⁰² However, the optional nature of guidelines under the Memorandum of Understanding promotes the development of ports of convenience in line with open register flags allowing rogue operators to avoid port state control measures.³⁰³ Arguably, an optional MOU could not address this issue. An instrument adopted by the ATS and IMO establishing mandatory duties and responsibilities on gateway ports, focussing on supplementing conditional port access with punitive measures, could complement a MOU and explicitly provide for mitigation measures reducing the biosecurity threat of ship discharges and bio fouling. With no similar provisions found in international law, there is no risk of duplication highlighted by the ATME on Ship Borne Tourism in its recommendation to focus on existing port state control measures rather than developing new ones.³⁰⁴ The argument that restricting tourist vessels utilising port states services is contrary to free trade agreements will be addressed in relation to fisheries.³⁰⁵

3.3.3. SUMMARY OF INTERNATIONAL PROVISIONS RELEVANT TO TOURISM

The CBD provides a useful model for addressing sustainable tourism, which AT Parties should attempt to implement in relation to the management of Antarctic tourism. A strategic and structured approach to regulation, rather than focussing reactively on areas intensively used by the industry, will allow for targeting the biosecurity threats posed by tourist activities. An appropriate location to supervise and enforce this approach is the port, where biosecurity threats posed by ships can be identified and mitigated. Certainly, port states have the discretion to refuse services to ships for the purposes of quarantine, as long as they are non-discretionary and consistent. However, without a new instrument, departure state jurisdiction cannot be adequately or effectively enforced to target the Antarctic area.

waters under the jurisdiction of the Member States, of international standards for ship safety, pollution prevention and shipboard living and working conditions (port State control) (1995) Official Journal L 157; effectively makes the Paris MOU on Port State Control (1982) mandatory on EU states, see; E J Molenaar, 'EC Directive on Port State Control in Context' (1996) 11(2) *International Journal of Marine and Coastal Law* 241.

³⁰¹ Molenaar, above n 272, 244.

³⁰² Vicuña, above n 272, 68; ASOC, above n 247.

³⁰³ Molenaar, above n 272, 226.

³⁰⁴ *Chair's Report of Antarctic Treaty Meeting of Experts on Ship Borne Tourism in the Antarctic Treaty Area* (2009), 46-54.

³⁰⁵ See below Section 3.4.1.

3.4 SOUTHERN OCEAN FISHERIES AND INTERNATIONAL BIOSECURITY

The customary freedom to fish in the high seas and primacy of flag state jurisdiction³⁰⁶ is safeguarded in UNCLOS, although expressly subject to their other treaty obligations.³⁰⁷ Although the implementation of the ecosystem approach to fisheries implicitly requires fisheries management to address the indirect impacts of fishing on elements of the ecosystem,³⁰⁸ including NNS, CCAMLR already provides for ecosystem based management.³⁰⁹ In addition, no instrument or guidance under the IMO or FAO address the specific biosecurity risks associated with fisheries activities in the Antarctic area. The CBD complements CCAMLR's conservation measures as it does PEPAT,³¹⁰ with Article 8(h) providing an obligation to address the biosecurity threats of fishing beyond the limited formulation found in CCAMLR.³¹¹ However, beyond the promotion of non-binding guidelines addressing the biosecurity risks associated with the maritime environment,³¹² mariculture and aquaculture³¹³ and encouragement for States to mitigate against NNS spread through live bait.³¹⁴

³⁰⁶ UNCLOS, Article 87 (e); Article 116; 89, 92(1).

³⁰⁷ UNCLOS, Article 116 invokes their treaty obligations (including UNCLOS Article 196(1), MARPOL 73/78 and the Ballast Water Convention where ratified by the flag state), rights and duties and interests of coastal states and the provisions of section 2 of Part VII of the convention, including the obligation to conserve high seas resources (Article 117), cooperate to conserve and manage the resources (Article 118) and base the measures on the best scientific evidence available (Article 119).

³⁰⁸ For example: invoked expressly in UNCLOS, Article 119(b); FAO, *FAO Code of Conduct for Responsible Fisheries* (adopted 31 October 1995) ('FAO Code of Conduct') [6.1, 6.2, 6.4, 6.6, 7.2.2, 7.2.3] and *The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks 1995*, opened for signature 4 August 1995, 34 *International Legal Materials* 1542 (entered into force 11 December 2001) ('FSA') Article 5 (d) and (e); S M Garcia, 'The precautionary principle: Its implications in capture fisheries management' (1994) 22 *Ocean and Coastal Management* 99.

³⁰⁹ A Fabra and V Gascon, 'The Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) and the Ecosystem Approach' (2008) 23 *The International Journal of Marine and Coastal law* 567, 578.

³¹⁰ The provision for sustainable use and conservation of biological resources is explicitly provided in the objectives of both instruments (CCAMLR, Article 2; CBD, Article 1).

³¹¹ CBD, Article 1; CCAMLR, Article 3.

³¹² CBD COP, *Conservation and sustainable use of marine and coastal biological diversity, including a programme of work*, Decision VII/5 (2004).

³¹³ See for example: CBD COP, *Alien Species that threaten ecosystems, habitats and species* Decision VIII/27 [20-24], that recommends implementing UNCLOS, Article 196 and the relevant non binding provisions of the FAO Code of Conduct; and

The CBD COP fails to provide appropriate measures to target the specific biosecurity threats associated with fisheries.

A significant number of fishing vessels operate outside of CCAMLR's jurisdiction in the Southern Ocean.³¹⁵ International fisheries law complements the ATS through compliance measures giving AT Parties the necessary mechanisms to supervise and enforce biosecurity measures on fisheries vessels operating outside the jurisdiction of CCAMLR. In addition, the potential biosecurity threat posed by fisheries activities to Antarctic migratory species beyond CCAMLR's jurisdiction is somewhat mitigated by the Convention on the conservation of migratory species of wild animals³¹⁶ requiring a consideration of NNS issues for certain migratory species.³¹⁷ In contrast, the International Whaling Commission³¹⁸ has not made any attempt to address the risks associated with NNS³¹⁹ and is expressly excluded from ATS governance by the AT.³²⁰ The issue of protecting migratory whale species in the Southern Ocean is complicated by AT Parties polemic stances on the issue,³²¹ the value of whales to scientific activity and the Antarctic ecosystem³²² and Antarctic tourist operators.³²³

S Gollasch, S Carlberg and E Kenchington, *Code of Practice on the Introductions or Transfers of Marine Organisms of the International Council for the Exploration of the Sea* (2004).

³¹⁴ The CBD COP XVIII urged parties to "take measures, as appropriate and consistent with their national and international obligations to control...live bait....that pose threats as invasive alien species;" (Ibid, Decision VIII/27, [53-54]; CBD Review identified "the risks associated with the introduction of alien species as live bait" as a gap in the international regulatory framework [92].

³¹⁵ UNCLOS, Article 118.

³¹⁶ *Convention on the conservation of migratory species of wild animals*, opened for signature 23 June 1979 1615 *United Nations Treaty Series* 356 (entered into force 1 November 1983) ('CMS').

³¹⁷ See below section 3.4.3.

³¹⁸ Established by Article 3(1) of the *International Convention for the Regulation of Whaling*, opened for signature 2 December 1946. 161 *United Nations Treaty Series* 72 (entered into force 10 November 1948) ('ICRW').

³¹⁹ An information paper submitted to the IWC has identified the risks of NNS, although it has not been discussed. Costa Rica, *Cetaceans and Other Marine Biodiversity of the Eastern Tropical Pacific: Options for Adapting to Climate Change*, IWC/61/18 (2009).

³²⁰ PEPAT, Annex II, Article 7; the definition of "whale" includes all the great whales but member governments differ on the legal competence of the IWC to regulate other species of the order of Cetacea. For more information, see A F Goetschel, *Legal Analysis of IWC Competence to Manage Small Cetaceans* (1998) <http://www.oceancare.org/de/downloads/OceanCare_Reports/ASMS_Legal_Opinion__Small_Cetacean_WEB.pdf>.

³²¹ See for example: B T Hodges, 'The Cracking Façade of the International Whaling Commission as an Institution of International Law: Norwegian Small-Type Whaling and the Aboriginal Subsistence Exception' (2000) 15 *Journal of Environmental Law and Litigation* 295.

³²² R Baird, 'The Antarctic Treaty system and Japan's scientific whaling in the Southern Ocean – is there an obligation to protect the Antarctic marine ecosystem?' (2008) 11 (3 and 4) *Asia Pacific Journal of International Law* 193, 195.

³²³ Almost all ship-borne tourism engages in whale watching activity; R Williams and K Crosbie, 'Antarctic Whales and Antarctic Tourism,' (2007) 4 *Tourism in Marine Environments* 2, 3.

3.4.1 MANAGING THE WORLD'S FISHERIES: SCOPE OF COMPLIANCE MEASURES

The hegemony of flag states control on the high seas is limited by the duty to cooperate with other States fishing on the high seas under UNCLOS. The duty is strengthened by the FSA in relation to straddling or highly migratory fish stocks³²⁴ which provides for cooperation with or joining a relevant regional fisheries management organisation ('RFMO')³²⁵ and excluding Parties outside the organisation.³²⁶ Any signatory state to the FSA³²⁷ must join CCAMLR to utilise the marine resources of the area and therefore submit to the biosecurity measures provided under the instrument. However, any form of flag state control has proved particularly problematic to implement in the Antarctic area. Although all current States listed under the CCAMLR IUU non-Party vessel list are parties to the FSA,³²⁸ some appear to have no records or contradictory records of the vessels listed.³²⁹ Although Togo, Equatorial Guinea, and Panama are CBD Members, none have ratified the Ballast Water Convention and none report addressing marine biosecurity in NBSAPs or National

³²⁴ Although strictly there are no straddling or migratory fish stocks exploited in the Southern Ocean, due to the lack of a sovereign delineation, some commentators assess all stocks exploited in the Southern Ocean as straddling stocks: J Maguire, *The state of world highly migratory, straddling and other high seas fishery*, (2006) FAO Fisheries technical paper No. 495, 42; E Meltzer, 'Global overview of Straddling and Highly Migratory Fish Stocks,' (Paper presented at the St Johns Conference on Governance of High Seas Fisheries and the UN Fish Agreement, May 1-5, 2005), 3.

³²⁵ FSA, Article 8(3).

³²⁶ FSA, Article 8(4).

³²⁷ The FSA is reasonably well ratified with 72 States including Panama, but neither Togo nor Equatorial Guinea have signed the agreement and the FSA does not create obligations for third parties, see discussion at: E Franckx, 'Pacta Tertiis and the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks' FAO Legal Papers Online 8 (2000), <<http://www.fao.org/legal/prs-ol/lpo8.pdf>> at 21 June 2009, 21.

³²⁸ Ships registered in Togo, Panama and Equatorial Guinea are currently listed on the CCAMLR IUU vessels list (See Figure 3.5 below: CCAMLR, Combined IUU Vessel Lists Adopted from 2003 to 2009).

³²⁹ For example: on 2007, a diplomatic demarche to Equatorial Guinea and Togo from the European Commission on behalf of CCAMLR established several irregularities with registrations of ships reported as IUU fishing vessels. Equatorial Guinea reported no fisheries vessels on their register, despite the 3 present on the CCAMLR IUU List at the time. Togo had 7 on the CCAMLR IUU List, only 2 of which were reported by the Togolese authorities. (Report of the Standing Committee on Implementation on Compliance to CCAMLR XXVII (2008), 3.25, 186.) The *Grand Prince Case (Belize v France)* International Tribunal for the Law of the Sea, Case No. 8, demonstrates that uncertain vessel registry sometimes aids enforcement action; evidence submitted by Belize failed to convince the Tribunal that Belize was the flag state of the vessel and therefore no "prompt release" could be engaged under Article 73(2) and 292 of UNCLOS.

Reports to the CBD.³³⁰ Without effective control over ships flying their flag, the flag states implementation of biosecurity provisions is irrelevant. The ability of these flag states to enforce measures on the high seas is minimal, especially in the isolated and large expanses of the Southern Ocean.³³¹ Sub-Antarctic coastal states have some jurisdiction to pursue IUU fishing within their EEZs.³³² A number of judgments by International Tribunal for the Law of the Sea ('ITLOS'), in the context of aggressive enforcement actions on vessels accused of IUU fishing in the EEZ of sub-Antarctic islands EEZs,³³³ refer to the importance of coastal states implementing CCAMLR jurisdiction.³³⁴

³³⁰ CBD, *National Reports Analyser* (2010) <<http://www.cbd.int/reports/analyzer.shtml>> at 20 February 2010.

³³¹ A J Constable, W K de la Mare, D J Agnew, I Everson, and D Miller, 'Managing fisheries to conserve the Antarctic Marine Ecosystem : practical implementation of the Conservation on the Conservation of Antarctic Marine Living Resources (CCAMLR),' (2000) *ICES Journal of Marine Science* 778.

³³² See for example: UNCLOS, Article 61.

³³³ The Camouco Case (Seychelles v France) Application for Prompt Release (2000) ITLOS Case No. 5, The Monte Confurco (Panama v France) Application for Prompt Release (2000) ITLOS Case No. 6; The Grand Prince Case (Belize v France) Application for Prompt Release (2001) ITLOS Case No. 8; The Volna Case (Russian Federation v Australia) (2002) ITLOS Case No. 11 .

³³⁴ See especially *Volna*, (68) ; Dissenting Opinion of Judge Anderson (1)-(2); the court indicated that the fact a vessel breached CCAMLR's Conservation Measures is a relevant factor when deciding the bail for the release of a vessel under Article 73(2) of UNCLOS.

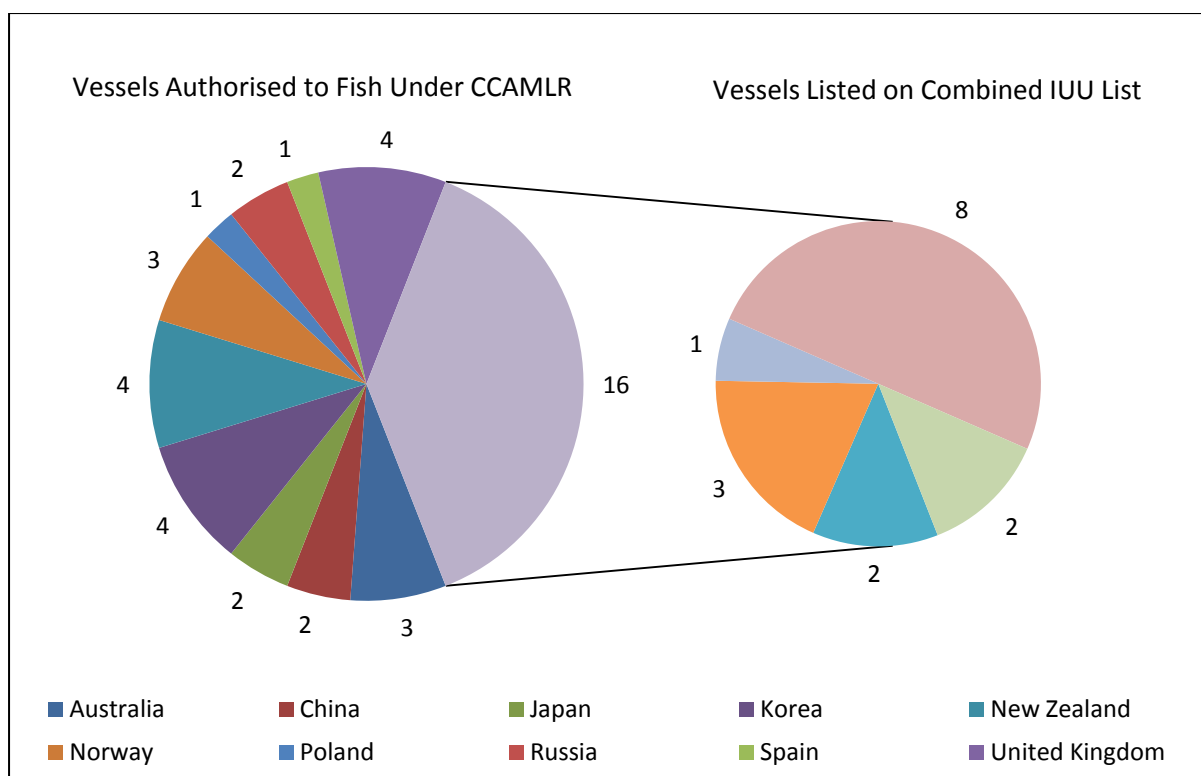


FIGURE 3.5: FISHING VESSELS NOTIFIED UNDER CCAMLR DURING THE 2008-09 SEASON³³⁵

Without effective flag state or coastal state jurisdiction, the port is the most appropriate place to address the potential biosecurity risks from legitimate and IUU fisheries in the Southern Ocean.³³⁶ The sovereign discretion for a port state to refuse services, particularly refusing landings and transshipments,³³⁷ is already established.³³⁸ The utility of fisheries law for biosecurity is the extent it creates mandatory port state responsibilities and a legal justification to board, detain and impose penalties on IUU vessels. Article 23(1) of the FSA³³⁹ provides for the port state to inspect documents, fishing gear and catch in port, although this is weakened by using “may” in relation to specific enforcement measures mentioned.³⁴⁰ The non-binding International Plan of Action on IUU Fishing³⁴¹

³³⁵ Based on CCAMLR Reports and Combined IUU vessel list; IUU estimates are conservative and based on sighted vessels from 2003-2009 so not necessarily reflective of current Southern Ocean activity.

³³⁶ Molenaar, above n 223, 233-235; B K Sovacool, and K E Siman-Sovacool, ‘Creating Legal Teeth for Toothfish: Using the Market to Protect Fish Stocks in Antarctica,’ (2007) 20(1) *Journal of Environmental Law* 15, 16.

³³⁷ See for example, FSA, Articles 23(2) and (3).

³³⁸ See above 3.2; R G Rayfuse, *Non-flag state enforcement in high seas fisheries* (2004), 65.

³³⁹ Departing from the non-binding FAO Code of Conduct: Molenaar, above n 223, 234.

³⁴⁰ *Ibid.*

also provides for port states to “take any actions consistent with international law” to prevent IUU fishing but Parties removed a phrase providing for “forfeiture of fish and fishery products”³⁴² and refers to consent by the flag state. Elements of the voluntary model scheme set up by the FAO to help implement the International Plan of Action³⁴³ have been formalised into a binding set of measures.³⁴⁴ Once in force, the FAO Port States Agreement will create a mandatory port state measures requiring advance notice of fishing vessels wishing to dock in port, inspection of vessels and where IUU fishing is suspected, refusal of entry and services.³⁴⁵ Although expressly not impacting on Parties discretionary capacity to take additional measures,³⁴⁶ even where an inspection determines clear evidence for IUU fishing, the instrument does not provide for any additional enforcement action without consent of a flag state.³⁴⁷ In addition, the instrument explicitly does not extend conservation measures adopted by a RFMO to non parties.³⁴⁸

The instrument also implicitly addresses the concern that limiting access to port services might be contrary to the General Agreements on Tariffs and Trade,³⁴⁹ providing for “fair, non discriminatory and transparent” application.³⁵⁰ GATT is part of the World Trade Organisation (‘WTO’) Agreements that provide binding rules and compulsory dispute settlement arrangements to ensure parties enjoy free market access to goods and services of other parties. Fisheries goods implicitly come under the article but Article V of GATT also provides for the freedom of transit, in particular providing that “except in the cases of failure to comply with applicable customs laws and regulations... traffic... will not be subject to any unnecessary delays or restrictions.”³⁵¹ Traditionally, quarantine rules have

³⁴¹ FAO, International Plan of Action to Prevent, Deter and Eliminate, Illegal, Unreported and Unregulated Fishing, adopted by consensus by the Food and Agriculture Organisation Committee on Fisheries on 2 March 2001 and endorsed by the FAO Council on 23 June 2001 (2001), [52].

³⁴² FAO, Report of the Expert Consultation to Review Port State Measures to Combat [IUU] Fishing, Rome 4-6 November 2002, FAO Fisheries Rep, no. 759 (2004).

³⁴³ Adopted by the FAO Council, Report of the 26th Session of the FAO Committee on Fisheries, Doc CL128/7 (2005), [25].

³⁴⁴ Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, UN FAO Conference, 36th session C 2009/LIM/11-Rev 1 (‘FAO Port State Agreement’).

³⁴⁵ See FAO Port States Agreement, Article 8(notification of arrival), Article 9 (denial of entry if IUU fishing); Article 12 (inspections), Article 11, 18(1)(b) (mandatory refusal of service after inspection shows evidence of IUU fishing).

³⁴⁶ Ibid, Article 4(1)(b).

³⁴⁷ Ibid, Article 18 (3).

³⁴⁸ Ibid, Article 4(2).

³⁴⁹ *General Agreements on Tariffs and Trade*, opened for signature 30 October 1947. 55 UNTS 187 (provs. 1 January 1948)(‘GATT’), reaffirmed in the *Final Act Embodying the Results of the Multilateral Trade Negotiations* (April 15 1994).

³⁵⁰ FAO Port State Agreement, Article 3(4); Shine 2000, 24-25.

³⁵¹ GATT, Article V(3); see also Article IX (general elimination of quantitative restrictions on imports).

been seen as an erosion of the trade benefits achieved through lowering tariffs and quotas and the GATT did little to resolve the issue.³⁵² GATT creates “quarantine like” exceptions necessary to protect human, animal or plant life or health or where measures related to the conservation of exhaustible natural resources.³⁵³ The Agreement on the Application of Sanitary and Phytosanitary Measures (‘SPM Agreement’)³⁵⁴ elaborates these rules to ensure quarantine is not used as a disguised restriction. The provisions, applicable to all WTO members,³⁵⁵ limits quarantine laws to those that are non-discriminatory, least trade restrictive and transparent.³⁵⁶ Moreover, the measures are restricted to protecting the States own territory.³⁵⁷ CCAMLR conservation measures have been relied upon to justify exemptions³⁵⁸ and nothing in the instrument derogates from the principle of State sovereignty over ports as long as the measures are applied in a non-discriminatory manner.³⁵⁹

The International Plant Protection Convention and World Organisation for Animal Health are also responsible for creating phytosanitary measures to govern trade, although these are essentially focussed on plant and animal “pests” that threaten the biodiversity of the territory of a State or groups of States.³⁶⁰ The measures have limited applicability to the Antarctic area but the IPPC creates an obligation for states to set up a designated National Plant Protection Organisation that is responsible for the designation, maintenance and surveillance of pest free areas consistent with the

³⁵² K C Kennedy, ‘Resolving International Sanitary and Phytosanitary Disputes in the WTO: Lessons and Future Directions’ (2000) 55 *Food and Drug Journal* 81, 83.

³⁵³ GATT, Article XX(b) and XX(g); Riley, above n 6, 333.

³⁵⁴ WTO, *Agreement on the Application of Sanitary and Phytosanitary Measures*, adopted 15 December 1993 GATT Doc. MTN/FA II-AIA-4 (Commenced 1 January 1995).

³⁵⁵ See *Appendix 8: Antarctic Actors Treaty Matrix*.

³⁵⁶ Shine, above n 5, at 24-27 lists the all the relevant stipulations in the SPS Agreement; international standards as a basis for SPS measures; risk assessment based on scientific principles; consistent application; least trade restrictive alternatives; acceptance of equivalent measures; and transparency through notification of trade measures. For a discussion of the relationship between biosecurity and trade law see: Riley, above n 6, 343-358.

³⁵⁷ Shine, above n 5, at 24.

³⁵⁸ The United States prohibits import of *Dissostichus eleginoides* on the basis of CCAMLR Resolution 18/XXI, 50 *Code of Federal Regulations* 300.107(c)(iii); E J Molenaar, ‘Port State Jurisdiction: Toward Comprehensive, Mandatory and Global Coverage,’ (2007) 38 *Ocean Development and International Law* 1, 238.

³⁵⁹ F O Vicuña, ‘Port State Jurisdiction in Antarctica’, in D Vidas (ed.) *Implementing the Environmental Protection Regime for the Antarctic* (2000), 60.

³⁶⁰ R Lopian, ‘Feasibility of the International Recognition of Pest Free Areas’ (Discussion Paper for the IPPC Open-Ended-Working—Group, 2008), 5-6.

SPM Agreement.³⁶¹ AT Parties could benefit from collaborating with the IPPC to ensure protected areas are adequately protected and confirming their consistency with trade rules.

There still remains a level of uncertainty when enforcing port state jurisdiction on foreign flag vessels³⁶² that could be remedied by the provision for mandatory and extensive port state measures for the implementation of biosecurity provisions in the Antarctic area through the IMO process or a separate treaty. The reliance on rules already in place to manage port state jurisdiction evoked by the ATME on Ship Borne Tourism is short-sighted.³⁶³

3.4.2. MIGRATORY SPECIES AND BIOSECURITY

The ecosystem approach of CCAMLR prompts members to address the impacts of fishing on other species, particularly through regulations restricting by-catch. CCAMLR is limited in its capacity to address the biosecurity threats fishing activities pose to migratory species. The Antarctic is home to many species of bird, fish and cetacean that are not bound by the political considerations of the Antarctic Treaty area or even the geothermal limits of the Convergence, yet form a part of the Antarctic ecosystem. Managing the risks posed by migratory species requires international cooperation beyond the limited scope of the ATS.³⁶⁴ As AT Parties are committed to the comprehensive protection of Antarctic ecosystems and managing the indirect impact of fishing activities, they are obliged to interact with other international frameworks that focus on species rather than geographic area.

The CMS is a framework convention with the objective of conservation and sustainable use of migratory species. The CMS's biosecurity provisions are limited in their applicability to the Antarctic area, primarily by its focus on endangered species and "Range States". Although Parties define migratory species broadly, "...the entire population or any geographically separate part of the

³⁶¹ IPPC, Article IV(2)(e); Ibid, 7; IPPC, *Requirements for the establishment of pest free areas*, International Standard on Phytosanitary Measures No. 4 (1995)

<<https://www.ippc.int/servlet/CDSServlet?status=ND0xMzM5OSY2PWVUJmZPSomMzc9a29z>> at 1 February 2009

³⁶² E J Molenaar, 'Port State Jurisdiction: Toward Comprehensive, Mandatory and Global Coverage,' (2007) 38 *Ocean Development and International Law* 1, 238.

³⁶³ *Chair's Report of Antarctic Treaty Meeting of Experts on Ship Borne Tourism in the Antarctic Treaty Area* (2009), Recommendation 6.

³⁶⁴ M J Bowman, 'International Treaties and the Global Protection of Birds: Part II,' (1999) 11(2) *Journal of Environmental Law* 281.

population of any species or lower taxon of wild animals”³⁶⁵ a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries “acknowledges the importance” of the conservation of all migratory species (CMS, Article II(1)) and provides for the promotion and cooperation of research in migratory species (CMS, Article II(3)), the instrument focuses on species with “unfavourable conservation status.” Favourable conservation status is defined by four factors being present on a “long term basis”: population dynamics data must indicate a stable place in ecosystem, the range must not be reduced, habitat must be sufficient and “the distribution and abundance of the migratory species approach historic coverage and levels to the extent that potentially suitable ecosystems exist and to the extent consistent with wise wildlife management.”³⁶⁶ Article III(1)(c) provides for Range States to take qualified biosecurity measures to protect listed endangered species that includes a number of Antarctic migratory species.³⁶⁷ The “Range State” is defined as “any State that exercises jurisdiction over any part of the range of that migratory species, or a State, flag vessels of which are engaged outside national jurisdictional limits in taking that migratory species.”³⁶⁸ The lack of explicit application to “areas outside national jurisdiction” limits the effectiveness of the CMS in the Antarctic.

Despite this limitation, one agreement under the CMS is expressly relevant to the Antarctic area.³⁶⁹ Under ACAP, Parties³⁷⁰ agree amongst a list of conservation measures to “eliminate or control non-native species detrimental to albatrosses and petrels.”³⁷¹ Activities that involve biosecurity threats, particularly linked to fishing activity, are not expressly addressed but the issue is the highest priority on the Advisory Committee Work Program and the Breeding Site Working Group has been instructed to make an invasive species list from each alien species at each breeding point.³⁷² ACAP is invited as an observer to the ATCM and CCAMLR and has cooperated with the assessment and classification of

³⁶⁵ CMS, Article I(a).

³⁶⁶ CMS, Article 1(1)(c).

³⁶⁷ For example: Cetacean species (Southern Right Whale, Sei Whale, Blue Whale, Fin Whale and Humpback Whale) and bird species (Southern Royal Albatross, Wandering Albatross, Sooty Albatross, Buller’s Albatross, Grey-headed Albatross, Shy-Albatross, Northern Giant Petrel, Southern Giant Petrel). CMS, Appendix 1.

³⁶⁸ CMS, Article 1(1)(h).

³⁶⁹ *Agreement on the Conservation of Albatrosses and Petrels*, opened for signature 19 May 2004. 2258 *United Nations Treaty Series* 257 (entered into force 1 February 2004) (‘ACAP’).

³⁷⁰ All the claimant states are party to the Treaty as well as five other Consultative Party states. Significantly, the US and Russian Federation are not party to the agreement.

³⁷¹ ACAP, Article VII, 1(b).

³⁷² ACAP, Report of ACAP Meeting of the Parties 2, (2006), 3.4.

the Southern Giant Petrel.³⁷³ Instruments like ACAP provide a practical conduit for environmental measures to pass between the ATS and the domestic structures outside Antarctica that govern migratory Antarctic species. However, an ideal instrument would be ratified by all the Parties to the Antarctic Treaty, especially those that engage in any kind of activity associated with the relevant migratory species.³⁷⁴ Although specific measures must play a role in the protection of identifiably vulnerable areas or species, they cannot replace a general ecosystem based approach to the issue of NNS in Antarctica.

3.4.3 SUMMARY OF INTERNATIONAL PROVISIONS RELEVANT TO FISHING

International fisheries management has very little to add to the biosecurity regime in the Southern Ocean. Development of port state measures to target IUU vessels offers a way to exclude risks from rogue operators but the risk of NNS introduction to areas beyond national jurisdiction has not been addressed. It is identified as a gap by the CBD and IUCN and requires comprehensive risk analysis at the domestic, regional and international level. The biosecurity threats posed by fisheries and other activities on certain migratory species are addressed by ACAP, although the provision represents a very narrow approach to the management of biosecurity.

3.5. CONCLUSION

The plethora of international agreements relevant to biosecurity outside the ATS offers significant guidance and a precautionary structure to biosecurity considerations within the Antarctic area. However, there is no strategic focus on the types of activities in the Antarctic area and only limited applicability for a biosecurity framework in the Antarctic. Certainly, the obligations and guidance in the CBD offer mechanisms to better implement PEPAT responsibilities. Unlike the AT, the CBD and UNCLOS explicitly provide generic requirements to prevent the introduction of harmful alien species and the former substantiates the provision through Guidelines and a reporting process. Biosecurity is treated as a cross-cutting issue by the CBD and is explicitly incorporated into impact assessment guidelines, programs dealing with marine and coastal biodiversity, protected areas and tourism. The

³⁷³ CEP, *Report of CEP XI* (2008), [280].

³⁷⁴ Including all fisheries activity in the Antarctic area: M J Bowman, 'International Treaties and the Global Protection of Birds: Part II,' (1999) 11 *Journal of Environmental Law* 2.

approach is a useful model of how to address the issue in the ATS. Area protection conventions have some application to biosecurity risks in the Antarctic and experience of their implementation should be utilised by AT Parties in protecting areas in the Antarctic. Addressing the introduction of NNS to migratory species poses a particular issue in integrating ATS processes with other international norms. Although the approach of ACAP promotes a precautionary approach to NNS, the lack of consideration within the IWC is a gap in Antarctic biosecurity that cannot be addressed by AT Parties alone. To create norms that are relevant to States outside the ATS, AT Parties need to collaborate more effectively with these organisations and move past any residue of sovereign entitlement.

A network of globally binding obligations and enforcement measures apply to Antarctic marine areas, regulating the considerable non-AT party activity in the area to a certain extent. The Ballast Water Convention coming into force and development of anti-biofouling procedures will address the considerable biosecurity risks associated with marine NNS. However, the current framework relies heavily on flag state implementation and does not expressly require port state measures to ensure compliance. In addition, the immunity for government vessels on non-commercial service significantly limits the utility of the international law of the sea for a precautionary biosecurity framework for the Antarctic. However, that the provisions in international and regional law promote comprehensive biosecurity frameworks is evident in the proactive domestic implementation of Australia and New Zealand. Both approaches will be discussed in the next Chapter, in relation to their Antarctic and sub-Antarctic territories. Moreover, the development of a mandatory Polar Code for the Antarctic, especially if provisions are developed for specific biosecurity consideration and port state control, could do much to fill the gaps in the current system.

4

AUSTRALIA AND NEW ZEALAND BIOSECURITY IN THE ANTARCTIC AND SUB-ANTARCTIC

“Antarctica New Zealand is committed to the biosecurity of both Antarctica and New Zealand and aims to minimise human transfer of species to areas where they are not naturally present.”¹

“Australia recognises that the movement of aircraft, vessels, personnel, support cargo and research equipment between Australia, Antarctica, the sub-Antarctic and the Southern Ocean creates a risk of transferring animals, plants, micro-organisms and materials of quarantine concern. The Australian Antarctic Division (AAD) is committed to conducting and administering activities in a way that will prevent or minimise such risks, consistent with the environmental principles of the Protocol on Environmental Protection to the Antarctic Treaty.”²

4.1 INTRODUCTION

Gaps in regional and international biosecurity regimes leave AT Parties without the institutional mechanics to comprehensively prevent or minimise the risks of introducing NNS into the Antarctic area. However, the broad environmental principles under PEPAT place a particular onus on AT Parties to take the initiative in implementing, supervising and enforcing effective biosecurity measures. Domestic biosecurity regimes focus on reducing the risks of harmful NNS introductions into the territory of the State and in marine zones allocated to the territory.³ In the development of

¹ Antarctica New Zealand (‘ANZ’), *Biosecurity and Non-native species* Health, Safety and Environment Policy 7 (2009), 1.

² Australia, *Principles underpinning Australia’s approach to Antarctic quarantine management* ATCM XXIX IP 44 (2006), 1.

³ M L Miller and L H Gunderson, ‘Biological and Cultural Camouflage: the Challenges of Seeing the Harmful Invasive Species Problem and Doing Something About It’, in M L Miller and R N Fabian, *Harmful invasive species: legal responses* (2004), 2.

an effective response to the risks of NNS introduction in the Antarctic, there is a significant place for case studies from States who have effectively applied domestic biosecurity arrangements to their Antarctic and sub-Antarctic operations.⁴ The frameworks provide models of best practice for other States to effectively implement the environmental principles of PEPAT and could be standardised into a comprehensive regime under the ATS. Moreover, gaps in the frameworks indicate areas where international cooperation is needed to exclude biosecurity threats. Australia and New Zealand are two such States that have also been heavily involved in the CEP consideration of the risks posed by NNS.⁵

Both States are island nations with unique ecosystems, have large agricultural industries and incur large costs from invasive NNS.⁶ In addition, both are Parties to the CBD with NBSAPs that identify biosecurity as a crucial factor in protecting biodiversity.⁷ As a consequence, both are world leaders in biosecurity with dedicated government departments and a host of legal controls on the intentional and unintentional introduction of NNS.⁸ Both also have a significant investment in the Antarctic continent, claiming collectively 45% of the territorial land mass of the continent and permitting their nationals to engage in scientific, tourist and fishing activities.⁹ It is, therefore, not surprising that both countries have developed sophisticated controls to deal with the unintentional introduction of NNS into the Antarctic environment. Both employ domestic policy with the intention of minimising the risk of introducing NNS into their Antarctic operations and prohibit commercial tourism activities

⁴ The importance of sharing experiences is highlighted by the CBD COP which requests States provide case-studies and experience focussing on the implementation of Article 8(h); CBD COP, CBD COP, *Alien species that threaten ecosystems, habitats or species (Article 8 (h)): further consideration of gaps and inconsistencies in the international regulatory framework* Decision VIII/27 (2006).

⁵ See *Appendix 1: Summary of Submissions to CEP on NNS*: (Australia and New Zealand have submitted or contributed to 18 of the 35 total submissions to the CEP on the subject of NNS).

⁶ Costs involved with Invasive NNS are over AUS\$7 billion per annum in Australia and NZ\$3.5 billion per annum in New Zealand (including multiplier costs); Australia, *Australia's Fourth National Report to the United Nations Convention on Biological Diversity* (2009) < <http://www.cbd.int/doc/world/au/au-nr-04-en.pdf> > at 29 April 2009; Nimmo-Bell, *Economic Costs of Pests to New Zealand*, MAF Biosecurity Technical Paper 31 (2009), 45.

⁷ Australia, *National Strategy for the Conservation of Australia's Biodiversity* (1996) <<http://www.environment.gov.au/biodiversity/publications/strategy/pubs/national-strategy-96.pdf>> ('Australian Biodiversity Strategy'), 37; New Zealand, *The New Zealand Biodiversity Strategy* (2000) <<http://www.biodiversity.govt.nz/pdfs/picture/nzbs-whole.pdf>> at 1 September 2009 ('NZ Biodiversity Strategy'), 79.

⁸ Miller and Gunderson, above n 3, 1; M McConnel, *GloBallast Legislative Review Final Report*, GloBallast Monography Series No.1 (2002), 71, 80.

⁹ Composed of approximately Australia (42%) and New Zealand (3%), although New Zealand's claim includes the 487,000 km² Ross Ice Shelf.

in the Antarctic without permits conditional on mitigating against NNS. Both also apply considerable biosecurity measures to their sub-Antarctic territories, which are utilised by scientists, tourists and the fishing industry. These factors make the two States excellent examples of how biosecurity regimes can be implemented in the Antarctic environment. Moreover, the high level of protection afforded to the sub-Antarctic in both States, particularly Australia where the complexities of overlapping federal responsibilities must be negotiated, permits a reflection on the limitations of jurisdiction based on nationality and jointly-administered territory. This chapter will evaluate and contrast the two nation's biosecurity measures relevant to the Antarctic and compare them with the measures taken in the sub-Antarctic, assessing their appropriateness as models of best practice for the ATS. As both have implicitly accepted a PEPAT principle to prevent the introduction of NNS,¹⁰ the gaps in their implementation of the principle will identify inherent problems in the ATS treatment of biosecurity.

4.1.1. A DOMESTIC BIOSECURITY FRAMEWORK

As discussed in the previous chapters, the fundamental problem with the ATS's treatment of NNS is the lack of a strategic biosecurity framework. The necessary comprehensive, cohesive and coordinated approach promoted by the IUCN¹¹ and prescribed by the CBD¹² to exclude the impact of NNS is a significant challenge that has not been met. Australia and New Zealand's proactive approaches employ Antarctic-specific policy and utilise the expertise of their domestic biosecurity agencies.¹³ Some biosecurity measures from the domestic provisions apply directly to Antarctic activities and provide the framework from which Antarctic-specific procedures can be built.¹⁴ In particular, the discretion available to port States identified in Chapters 2 and 3 permits the institution of quarantine measures on Antarctic bound ships to act as a buffer for Antarctic territorial and marine areas.

¹⁰ See: Australia, *Principles underpinning Australia's approach to Antarctic quarantine management* ATCM XXIX IP 44 (2006), 1; New Zealand, *A framework for analysing and managing NNS risks in Antarctica* ATCM XXXII IP 36 (2009), 2.

¹¹ C Shine, N Williams and G Gündling, *A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species*, IUCN Environmental Policy and Law Paper No. 20 (2000), 38.

¹² CBD, Article 6.

¹³ New Zealand, *ANZ and Biosecurity: Meeting with MAF MAFBNZ* Presentation by ANZ March 2008 (2008); Australia, *Australia's Antarctic Quarantine Practices*, IP071/ATCM XXVII (2004), 2.

¹⁴ S Potter, 'The Quarantine Management of Australia's Antarctic Program' (2006) 13 *Australian Journal of Environmental Management* 185, 187.

An Antarctic biosecurity framework should fit into a country's response to domestic biosecurity. The biosecurity frameworks of both Australia and New Zealand are composed of pre-border agreements and procedures, border control, contingency response plans, monitoring and a system of regional and national pest management for established NNS.¹⁵ As the Antarctic poses a set of unique risks requiring a range of vector-targeted interventions, a strategic and coordinated approach to biosecurity is essential on the domestic level.¹⁶ New Zealand's *Biosecurity Act 1993* achieves this through integrating the "law relating to the exclusion, eradication and effective management of pests and unwanted organisms".¹⁷ It links together the different components under the Ministry of Agriculture and Fisheries Biosecurity New Zealand ('MAFBNZ') and an advisory council.¹⁸ A MOU on biosecurity activities gives the overall responsibility for biosecurity issues to MAFBNZ, but links strongly with the Department of Conservation ('DOC'), the Ministry of Fisheries ('MFish'), the Ministry of Health and Maritime New Zealand.¹⁹

The Australian system, complicated by Federal and State responses, is much more fragmented.²⁰ The *Environment Protection and Biodiversity Conservation Act 1999* (Australia) ('EPBC Act') forms the nexus of Australia's efforts at attempting to preserve native biodiversity, protecting Commonwealth reserves and areas of national heritage.²¹ However, the primary legislation relevant to biosecurity, the *Quarantine Act 1908*, suffers from a narrow focus, administrative complexity and lack of clear intent.²² The Australian biosecurity system for primary production and the environment ('AusBIOSEC') is in the process of rationalising the government's biosecurity measures under an overarching national framework.²³ The "partnership approach" includes the Biosecurity Services Group of the Department of Agriculture, Forestry and Fisheries ('DAFF') that addresses pre-border

¹⁵ M Jay, M Morad and A Bell, 'Biosecurity: A policy dilemma for New Zealand' (2003) 20 *Land Use Policy* 121, 125.

¹⁶ Ibid.

¹⁷ *Biosecurity Act 1993* (NZ), Long Title.

¹⁸ Jay, above n 15, 125; a list of other pieces of relevant legislation and departments can be found on MAFBNZ's website: <<http://www.biosecurity.govt.nz/biosec/pol>>, (last updated 07/01/2009; accessed 10/10/2009).

¹⁹ MAFBNZ oversees border control and monitoring, DOC manages the control and containment of alien invasive species, *MOU on biosecurity activities between Ministry of Agriculture and Forestry and Department of Conservation, Ministry of Fisheries, and Ministry of Health*, 31 October 2006 (2006).

²⁰ R Beale, et al, *One Biosecurity: A Working Partnership: The Independent Review of Australia's Quarantine and Biosecurity Arrangements Report to the Australian Government* (2008) <http://www.daff.gov.au/_media/documents/about/beale/intro-exec-sum-rec.pdf> at 10 March 2010, 128.

²¹ Australia, above n 4, 79.

²² Beale, above n 20, 129.

²³ Australia, above n 4, 79.

and border control, the Department of Environment, Heritage and the Arts ('DEWHA') that addresses NNS containment and control and a range of Commonwealth and State legislation and regulatory measures, as well as national strategies targeting particular NNS issues.²⁴

The integration of biosecurity processes and focus on the environment develops the potential for utility in the Antarctic area. Although neither piece of central biosecurity legislation directly applies to nationals going into the Antarctic area, both apply to nationals returning to New Zealand and Australia from Antarctica and the sub-Antarctic islands (with the exception of the HIMI Islands).²⁵

4.1.2. LIMITATIONS IN THE ANTARCTIC: JURISDICTION

Although both New Zealand and Australia have long-established interests in the Antarctic continent,²⁶ only three other nations in the world recognise their territorial claims.²⁷ The scope of AT Parties' jurisdiction in the Antarctic limits their capacity to reduce the risks of introducing NNS, particularly given the large number of different States operating within the Ross Dependency and AAT.²⁸ Through implementing Article 4 of the AT,²⁹ the States effectively acknowledge the territorial dispute and limit their jurisdiction to their own nationals. However, the significance of the claims should not be underestimated, particularly in relation to the maritime zones.³⁰ The Antarctic-specific legislation of both countries expressly applies to all individuals in their respective Antarctic

²⁴ Ibid, 79-80.

²⁵ Potter, above n 14, 190-1; ANZ, *Environmental Legislation applying to New Zealanders in Antarctica* (2010) <<http://www.antarcticanz.govt.nz/images/downloads/environment/may%202010%20nzlegislation.pdf>> at 2 January 2010.

²⁶ The United Kingdom claimed the Ross Dependency (the sector between 150° and 160° west longitude) under the administration of New Zealand through an Order-In-Council in 1923 (*Order in Council Under the British Settlements Act*, (1887) 50 & 51 Vict c 54; *Imperial Laws Application Act 1988* (NZ), Schedule II) and transferred the Australian Antarctic Territory (the sectors between 45° and 136° east longitude and 142° and 160° east longitude;) to Australia in 1933 (*Australian Antarctic Territory Acceptance Act 1933*, Act No. 8 of 1933).

²⁷ A D Hemmings, 'Problems posed by attempts to apply claimant's domestic legislation beyond its own nationals in Antarctica' (2008), 11 (3 & 4) *Asia Pacific Journal of Environmental Law* 207, 208.

²⁸ Four stations operate within the Ross Dependency; McMurdo Station (USA), Scott Base (NZ), Amundsen-Scott South Station (USA), Zucchelli Station (Italy) and 9 in the AAT; Mawson (Australia), Zhongshan (China), Law-Racovita Station (Romania), Progress Station (Russia), Davis (Australia), Vostok (Russia), Casey (Australia), Concordia Station (France and Italy).

²⁹ *Antarctic Act 1960* (NZ) and *Antarctic Treaty Act 1960* (Australia) (both enact the text of the AT in an attached Schedule).

³⁰ D R Rothwell and S V Scott, 'Flexing Australian Sovereignty in Antarctica: Pushing Antarctic National Treaty Limits in the National Interest,' in L Kriwoken, J Jabour and A Hemmings (eds.) *Looking South: Australia's Antarctic Agenda* (2007), 12.

territories.³¹ New Zealand maintains its right of sovereignty over the Ross Dependency³² but safeguards exist in the implementing legislation to prevent application to third parties.³³ New Zealand has not formally commenced the Ross Dependency territorial or contiguous zone,³⁴ declared an EEZ or submitted data to the CLCS, instead taking a “cooperative and low key” approach to the issue of maritime zones.³⁵ Australia’s approach is a little more aggressive, although also has inbuilt safeguards.³⁶ The official policy only applies Australian law to foreign nationals who voluntarily submit to Australian jurisdiction.³⁷ However, Australia “has [also] increasingly legislated for the Antarctic continent”³⁸ proclaiming an EEZ adjacent to the AAT in 1994³⁹ and under the *Environmental Protection and Biodiversity Conservation Act 1999* (Australia) (‘EPBC Act’), declaring an Australian Whale Sanctuary.⁴⁰ Killing, injuring and taking whales in the Sanctuary are strict liability offences within the EEZ⁴¹ that explicitly includes the AAT EEZ.⁴² An Australian Federal Court confirmed that these provisions apply to non-nationals in a 2008 ruling, ordering declaratory relief and an injunction against Kyodo Senpaku Ltd, a Japanese whaling company operating in the Southern Ocean.⁴³ The case highlights the potential significance of Australian biosecurity legislation

³¹ *Antarctic Act 1960* (NZ), Section 3(1); *Antarctic Treaty Act 1960* (Australia), Section 4(1); *Antarctic (Environmental Protection) Act 1994* (NZ), Section 2(a); *Antarctic (Environment Protection) Act 1980* (Australia), Section 4(1)(a).

³² I Zovko, ‘Vessel sourced pollution in Southern Ocean’, in G Triggs and A Riddel (eds.), *Antarctica Legal and Environmental Challenges for the Future* (2008), 197.

³³ See for example: *Antarctic Act 1960* (NZ), Section 3(3); *Antarctic (Environmental Protection) Act 1994* (NZ), requiring the Attorney General’s consent to extend jurisdiction to a non-national under either Act).

³⁴ *Territorial Sea, Contiguous Zone and Exclusive Economic Zone Act 1977* (NZ); the legislation has never been formally commenced.

³⁵ Although reserved the right to do so; J Mossop, ‘Opposing Japanese Whaling in the Southern Ocean’ (2008) 11 (3 & 4) *Asia Pacific Journal of Environmental Law* 227, 228.

³⁶ *Antarctic Treaty (Environment Protection) Act 1980* (Australia), Section 7(1): “Notwithstanding any other law, no action or proceeding lies against any person for or in relation to anything done by that person to the extent that it is authorized by a permit or by an authority of another Contracting Party.”

³⁷ Rothwell and Scott, above n 30, 12.

³⁸ T Stephens, ‘The Japanese Whaling Case: Implications for Australia and Beyond,’ (2008) 11 (3-4) *Asia Pacific Journal of Environmental Law* 143.

³⁹ *Seas and Submerged Lands Act 1973 Proclamation*, Commonwealth of Australia Gazette (Special), No. S290, Friday, 29 July 1994 (1994); Australia also submitted a continental shelf claim to the CLCS that includes information pertaining to the shelf adjoining the AAT in 2004; see CLCS, *Summary of the Recommendations of the Commission on the Limits of the Continental Shelf (CLCS) in regard to the Submission made by Australia on 15 November 2004*, (2008) [3].

⁴⁰ *Environment Protection and Biodiversity Protection Act 1999* (Australia) (‘EPBC Act’), Section 255.

⁴¹ *Ibid*, Section 229-230.

⁴² *Ibid*, Section 225(2), 5(1), 5(4), and 5(5); *Australian Antarctic Territory Act (1954)* (Australia), Section 8 and *Sea and Submerged Lands Act 1973* (Australia), Section 10; R Baird, ‘They Said They’d Never Win: Humane Society International Inc v Kyodo Senpaku Kaisha Ltd’ (2008) (3-4) *Asia Pacific Journal of Environmental Law* 11, 152.

⁴³ *Humane Society International Inc v Kyodo Senpaku Kaisha Ltd* (2008) FCA 3.

in the AAT and its attached marine zones. However, any utility to sovereign enforcement must be balanced by the potential to destabilise the ATS and its implicit values requiring attention to biosecurity considerations.⁴⁴

4.1.3 ESTABLISHED SPECIAL AREAS: PROTECTING THE SUB-ANTARCTIC

Australia and New Zealand's approaches to their sub-Antarctic territories⁴⁵ offer an opportunity to assess the effectiveness of a territorial biosecurity framework over the nationality based approach in the Antarctic. It also offers a perspective on the objectives underlying biosecurity measures and the extent sovereign states have an interest in protecting environmental values in pristine areas. Where the areas are visited by tourist or scientific vessels en-route to the Antarctic, measures addressing biosecurity threats also provide a buffer to the Antarctic environment. Although the damage to biodiversity by NNS on some of the islands is irreversible,⁴⁶ each island and island group has a distinct ecosystem and some are still pristine.⁴⁷ Thus, as in the Antarctic, the focus of biosecurity has been precautionary and preventative management of pathways of introduction.

TABLE 4.1: NUMBER OF INVASIVE SPECIES REPORTED IN SUB ANTARCTIC ISLANDS OF AUSTRALIA AND NEW ZEALAND⁴⁸

	McDonald	Heard	Macquarie	Snares	Antipodes	Campbell	Auckland	Bounty
Plants	0	2**	3	2	1	85	37	0
Invertebrates	0*	2**	28	*	*	*	*	0*
Vertebrates	0	0	6	0	1	1	3	0

The legal status of the areas determines the human interaction, affording the islands some of the most stringent protections available under domestic law.⁴⁹ New Zealand Sub-Antarctic islands

⁴⁴ D K Anton, 'Australian Jurisdiction and Whales in Antarctica: Why the Australian Whale Sanctuary in Antarctic Waters Does Not Pass International Legal Muster and is also a Bad Idea as Applied to Non-Nationals,' (2008) 11 (3-4) *Asia Pacific Journal of Environmental Law* 171, 178.

⁴⁵ New Zealand also has jurisdiction over five sub-Antarctic island-groups: the Snares, Bounty Islands, Antipodes Islands, Auckland Islands and Campbell Islands and Australia has jurisdiction over two sub-Antarctic territories: Macquarie Island and the Heard and McDonald Island Group (HIMI Territory).

⁴⁶ Y Frenot *et al*, 'Biological invasions in the Antarctic: extent, impacts and implications,' (2005) 80 *Biological Reviews* 45, 51.

⁴⁷ T Tin, *et al*, 'Impacts of local human activities on the Antarctic Environment,' (2009) 21 *Antarctic Science* 1, 15

⁴⁸ * Unknown figure. ** These species are believed to have spread naturally. Frenot, above n 46; *Ibid*.

⁴⁹ M S De Villiers, *et al*, 'Conservation Management at Southern Ocean Islands: towards the Development of Best-Practice Guidelines' (2006) 75 (2-3) *Polarforschung* 113, 116-117.

(‘NZSAI’) are protected as national nature reserves under the Reserves Act 1977; areas designated to “protect indigenous flora or fauna.”⁵⁰ The Southland Conservancy of Department of Conservation manages the reserve⁵¹ and produced the New Zealand Sub Antarctic Island Conservation Management Strategy (‘NZSAI CMS’) ⁵² under the *Conservation Act 1987*.⁵³ The strategy includes a requirement to develop biosecurity procedures that are implemented in a separate plan.⁵⁴ The terrestrial sea adjacent to the Auckland Islands is “fully protected” as a Marine Reserve⁵⁵ and a marine mammal sanctuary by the DOC Southland Conservancy.⁵⁶ Further marine protection for the sub-Antarctic is proposed, but has yet to be implemented.⁵⁷

The HIMI and Macquarie Island are world heritage and national heritage areas under the EPBC Act, which also applies to the extensive Marine Reserves adjacent to the territories.⁵⁸ Under the EPBC Act, an individual can only engage in certain activities in accordance with a management plan.⁵⁹ However, Macquarie Island is part of the state of Tasmania and is listed as a National Park under the *National Parks and Reserves Management Act 2002* (Tasmania). Macquarie’s Management Plan, produced by the Tasmanian Parks and Wildlife Service, prohibits all activity without a permit on the islands, and 3 nautical miles off the shore,⁶⁰ and contains a strict Quarantine Management plan.⁶¹

⁵⁰ *Reserves Act 1977* (NZ), Section 20 (1); in addition, the cultural and spiritual significance of the islands to iwi requires protection to taonga species and historical spaces: NZSAI CMS, 75.

⁵¹ *Conservation Act 1987* (NZ), Section 6(a).

⁵² Although up for its 10 year review in 2008, the Southland Conservancy Board approved an extension of the CMS for four years in February 2008. DOC, *Minutes of a meeting of the Southland Conservation Board held on Tuesday 26 February 2008*; <<http://www.doc.govt.nz/upload/documents/getting-involved/nz-conservation-authority-and-boards/conservation-boards-by-region/southland/southland-board-mins-feb08.pdf>> at 29 October 2009.

⁵³ *Conservation Act 1987* (NZ), Section 17D(1).

⁵⁴ NZSAI CMS, 5.3.2; D Agnew, A Roberts and G Harper, *Island Biosecurity Plan: Southland Conservancy*, DOC (2008) (‘NZSAI Biosecurity Plan’).

⁵⁵ *Marine Reserves Act 1971* (NZ); *Marine Reserve (Auckland Islands – Motu Maha) Order 2003* (SR 2003/389) (NZ).

⁵⁶ *Marine Mammal Protection Act 1978* (NZ).

⁵⁷ Subantarctic Marine Protection Planning Forum (NZ), *Implementation of the Protected Areas of the Territorial Seas of the Subantarctic Biogeographic Region of New Zealand: A Consultation Document* (2009) <<http://www.biodiversity.govt.nz/pdfs/seas/subantarctics-mpa-policy-consultation-document.pdf>> at 28 February 2010.

⁵⁸ *EPBC Act 1999*, Section 5; T Stephens and B Boer, ‘Enforcement and Compliance in the Australian Antarctic Territory: Legal and Policy Dilemmas,’ in J K Kriwoken, J Jabour and A D Hemmings (eds.), *Looking South: Australia’s Antarctic Agenda* (2007), 63.

⁵⁹ *EPBC Act*, Section 354(1).

⁶⁰ Tasmanian Parks and Wildlife Service, *Macquarie Island Nature Reserve and World Heritage Area Management Plan 2006* (2006) (‘Macquarie Island Management Plan’) 104; *National Parks and Reserves Management Act 2002* (Australia, Tasmania), Section 37.

⁶¹ Macquarie Island Management Plan, 98.

Species-specific long term control measures also apply to the management of NNS on Macquarie Island.⁶² The Macquarie Island Commonwealth Marine Park⁶³ is administered by the Director of National Parks under the EPBC Act, although in close cooperation with the Tasmanian State Government⁶⁴ and the Australian Antarctic Division ('AAD') under a MOU.⁶⁵ The Macquarie Island Management Plan expired in 2008 and interim management arrangements limit activities in the area.⁶⁶ The lack of clarity between the different stakeholders has proved a challenge in practice and played a part in management oversights.⁶⁷

The administration of the HIMI Territory and Marine Reserve is not as complex as Macquarie Island with the AAD directly managing the area under the EPBC Act.⁶⁸ The HIMI Marine Reserve Management Plan,⁶⁹ prepared by the AAD, provides a unified regulatory framework and addresses the issue of NNS.⁷⁰ In practice, Quarantine Tasmania is still responsible for implementing biosecurity measures on HIMI bound vessels and the legislative framework is quite convoluted.⁷¹ The EPBC Regulations allow for the control of a broad range of activities in the reserve but the *Environmental Protection Management Ordinance 1987* (Australia) ('EPMO') makes it an offence to bring an organism onto the HIMI Territory without a permit⁷² and provides for a greater range of sanctions.⁷³

⁶² Macquarie Island Management Plan, 15; DEWHA, *The Threat Abatement Plan for Predation by Feral Cats* (2008); DEWHA, *The Threat Abatement Plan for Competition and Land Degradation by Feral Rabbits* (2008) and DEWHA, *Recovery Plan for Albatrosses and Giant Petrels* (2001).

⁶³ One third of the Australian Exclusive Economic Zone surrounding Macquarie Island makes up the Marine Park.

⁶⁴ Including the Parks and Wildlife Service of the Department of Tourism, Arts and the Environment and the Department of Primary Industries and Water.

⁶⁵ Macquarie Island Management Plan, Appendix 8; Service Level Agreement between the Director of National Parks (Commonwealth) and the Crown represented by the Department of Tourism, Parks, Heritage and the Arts (Tasmania), made on the 11th January 2005.

⁶⁶ DEWHA, *Management of Macquarie Island Commonwealth Marine Reserve* (2009), <<http://www.environment.gov.au/coasts/mpa/macquarie/management.html>> at 11 February 2010.

⁶⁷ S Potter, 'The Quarantine Protection of Sub-Antarctic Australia: Two Islands, Two Regimes' (2007), 2(2) *Island Studies Journal* 177, 188; see for example: P N Lewis, D M Bergtrom and J Whinam, 'Barging in: A Temperate Community Travels to the Subantarctic' (2006) 8(4) *Biological Invasions*, 787-795.

⁶⁸ DEWHA, *DEWHA Service Charter, 2009-2012* (2009) <<http://www.environment.gov.au/about/publications/pubs/dewha-service-charter-2009-12.pdf>> at 4 July 2010; AAD, *Heard Island and McDonald Islands Marine Reserve Management Plan* (2005) ('HIMI Management Plan'), 17.

⁶⁹ Integrating the marine and terrestrial areas; HIMI Management Plan, 9 [1.3].

⁷⁰ HIMI Management Plan, 65.

⁷¹ Potter, above n 67, 188.

⁷² EPMO, 14(1)(a).

⁷³ EPBC Act 1999, Section 354(2) (maximum for natural person: 500 penalty units) compared with EPMO Section 25(3)(a) (maximum for natural person: 20 penalty units or imprisonment for a period not exceeding 12 months).

Moreover, unlike the EPBC Act or Regulations, the EPMO 1987 prohibits entry into the area without a permit.⁷⁴ Due to the national significance of the area, the EPMO 1987 is retained and takes precedence, unless inconsistent with the EPBC Act or Regulations.⁷⁵ The remoteness and lack of frequent visitation could be a significant factor in the lack of NNS incidents thus far, rather than the effectiveness of the regulations.⁷⁶ However, the HIMI Management Plan provides cohesiveness to the regulations and substantial provision for biosecurity.

4.2. DOMESTIC MANAGEMENT OF NATIONAL ANTARCTIC PROGRAMS

The central role that many governments play in supporting and driving scientific activities in the Antarctic provides the ideal catalyst for a strong focus on biosecurity measures and the promotion of research supporting the management of NNS risks. Antarctica New Zealand ('ANZ'), the New Zealand NAP is responsible for "managing New Zealand's Antarctic activities."⁷⁷ The importance of the collective principles of the ATS in managing activities is evident in the mandate of the Crown entity. ANZ must act consistently with the need to conserve the intrinsic values of Antarctica and the Southern Ocean and active and responsible stewardship of the Ross Dependency for future generations.⁷⁸ A draft strategic framework informs the research ANZ supports, linked together with the underlying theme of "global change".⁷⁹ In this framework, NNS issues are considered important: biosecurity is identified as an issue of National interest by the key Government end users of Antarctic research in 2008.⁸⁰ The draft science strategy produced by the meeting includes supporting "biodiversity research related to the New Zealand Biodiversity Strategy and New Zealand's commitments to the CBD."⁸¹ Although no supported projects addressed the issue in the 2008/09 season, several projects supported by ANZ have assessed risks posed by biosecurity.⁸² The Australian

⁷⁴ EPMO, Section 12(1).

⁷⁵ EPBC Act 1999, Section 10 and 365(3).

⁷⁶ C.f. Potter, above n 67, 187.

⁷⁷ New Zealand Antarctic Institute Act 1996 (NZ), Long Title.

⁷⁸ Ibid, Section 6(a), (b).

⁷⁹ Foundation for Research, Science and Technology, *Draft New Zealand Antarctic Science Strategy*, (2009) < <http://www.frst.govt.nz/files/Antartica%20Draft%20Science%20Strategy.pdf>> at 3 May 2009.

⁸⁰ Ibid, 4.

⁸¹ Ibid, 9.

⁸² For example: P A Broady and R A Smith, 'A preliminary investigation of the diversity, survivability and dispersal of algae introduced into Antarctica by human activity' (1994) *Proceedings of the NIPR Symposium on Polar Biology* 7; R L Farrell, et

Antarctic Division ('AAD') of the Department of the Environment, Water Heritage and the Arts manages Australia's environmental obligations under the AT.⁸³ In contrast with the support role of ANZ, the AAD is responsible for conducting Antarctic research directly and managing Australian National Research Expeditions. One of the central themes that the Australian Science Strategy addresses is the "[i]mpact of human activities in Antarctica".⁸⁴ In the 2008/2009 season alone, four projects including one coordinated by the AAD itself addressed the issue of NNS in Antarctica.⁸⁵

Despite the focus of the research, both New Zealand and Australia expose the Antarctic environment to a significant risk of NNS introduction through their activities. In the 2008/09 season, ANZ supported twenty-nine scientific events, slightly less than the thirty supported in the 2007/2008 season.⁸⁶ Scientific activities on this scale require significant support including flights, shipping and a permanently occupied station on Ross Island, all of which increase risks of NNS introduction.⁸⁷ Fourteen plane trips and four voyages via sea travelled into Antarctica to support the Australian program in the 2009/2010 season.⁸⁸ Moreover, New Zealand is limited in its management capacity: American ships and aeroplanes play a key role in supporting New Zealand science.⁸⁹ As a consequence, New Zealand does not have the ability to regulate all of the vectors that are involved

al, 'Scientific evaluation of deterioration of historic huts of Ross Island, Antarctica' in S Barr and P Chaplin (eds.) *Historical Polar Bases – Preservation and Management* (2008); Frenot, above n 46.

⁸³ DEWHA, above n 68.

⁸⁴ AAD, *Australia's Antarctic Science Program: Science Strategy 2004/5-2008/9* (2004) <http://www.aad.gov.au/MediaLibrary/asset/MediaItems/ml_381406578356481_ScienceStrategy.pdf> at 4 September 2009 ('AAD Science Strategy'), 6.

⁸⁵ AAD, *Approved Science Projects for the season 2008/9* (2010), <http://its-db.aad.gov.au/proms/public/projects/projects_by_program.cfm?season=0809&PG_ID=7> at 2 July 2010; D Bergstorm, *Aliens in Antarctica*, Science Project 2904; M Power, *Tracking Antimicrobial Resistance from Human Sewage to the Antarctic Environment*, Science Project 2936; G Shellam, *Status of Disease in the Emperor Penguins of Auster Rookery*, Science Project 2954; R McFarlane, *Infectious diseases of Antarctic seals with potential population, zoonotic and quarantine significance*, Science Project 3070.

⁸⁶ New Zealand, *Science Supported by New Zealand*, ATCM XXXII IP 24 (2009), 15; ANZ, *ANZ Annual Report 2007/2008* (2008) <http://www.antarcticnz.govt.nz/images/downloads/annualreport/annualreport_2008lr.pdf> at 3 May 2010, 18.

⁸⁷ Scott Base (77° 51' S 166° 46' E); J E Lee and S L Chown, 'Quantifying the propagule load associated with the construction of an Antarctic research station' (2009) 21 *Antarctic Science* 5, 8.

⁸⁸ AAD, 'Shipping Schedule for Season 2009/10', <<http://its-db.aad.gov.au/proms/public/schedules/flight.cfm?season=0910>> at 10 April 2010; AAD, 'Flight Schedule for Season 2009/10', <<http://its-db.aad.gov.au/proms/public/schedules/flight.cfm?season=0910>> at 4 April 2010.

⁸⁹ A L Fortune, *Biosecurity at the Extreme: Pathways and Vectors between New Zealand and Scott Base, Antarctica* (Masters Thesis, University of Canterbury, 2006), 9.

with its scientific program.⁹⁰ Science also plays a key role in exposing the NZSAI to NNS as the greatest pressure for access comes from researchers.⁹¹ However, the Southland Conservancy of DOC must approve all access and prioritises research that will assist with management goals, including biosecurity.⁹² The Australian program is larger and thus exposes the environment to a higher risk of introducing NNS. Supporting three permanently occupied, continental stations⁹³ with a dedicated ice breaker, the *Aurora Australis*, the AAD supported 175 projects in the 2008-09 season.⁹⁴ Moreover, the AAD conducts and supports science in the sub-Antarctic,⁹⁵ with a permanent base on Macquarie Island and infrequent visits to the HIMI region to conduct science and environmental management activities.⁹⁶ Both Australia and New Zealand engage in an independently audited environmental management system to ensure environmental impacts are managed adequately.⁹⁷

4.2.1. PLANNING PROCESSES TO AVOID THE INTRODUCTION OF NNS

Both States implement the planning principles of PEPAT in strategically managing environmental impacts of their Antarctic operations. While the legislation implements PEPAT's biosecurity-relevant mechanisms without any additional requirements other than significant penalties for breaching provisions,⁹⁸ specific biosecurity policies of both countries go beyond the explicit stipulations of Annex II, Article 4, integrating elements of PEPAT and their domestic quarantine systems to manage the risk of introducing NNS through their Antarctic operations.⁹⁹ Both policies provide guiding

⁹⁰ Interview with Neil Gilbert, Environmental Manager, ANZ (ANZ, International Antarctic Centre, 11 April 2009).

⁹¹ C West, *NZSAI Research Strategy*, Southland Conservancy of DOC (2005), 6.

⁹² *Ibid*, 26.

⁹³ Casey (66°17' S 110°31' E), Mawson (67°36' S 62°52' E) and Davis Station (68°35' S 77°58' E).

⁹⁴ AAD, above n 85.

⁹⁵ AAD Science Strategy, 6.

⁹⁶ HIMI Management Plan, 127.

⁹⁷ Australia, *The Australian Antarctic Division's Environmental Management System* ATCM XXV IP 56 (2002); New Zealand, *ISO 14001 Environmental Management System in New Zealand Institute Experience*, SATCM XII IP 15 (2000).

⁹⁸ See *Antarctic (Environmental Protection) Act 1994* (NZ), Sections 28-29; *Antarctic (Environment Protection) Act 1980* (Australia), Section 19, c.f. the *EPBC Act 1999* alters what is required by Australian operators, prohibiting actions that will have or are likely to have "significant impacts" on the marine environment and areas of "national environmental significance" without a permit, both relevant in the Antarctic: Section 23(1). L D Fallon and L K Kriwoken, 'Environmental Impact Assessment under the Protocol on Environment Protection to the Antarctic Treaty and Australian Legislation' (2005) 2 *Macquarie Journal of International and Comparative Environmental Law* 67, 73-76.

⁹⁹ New Zealand, above n 8, 4; Potter, above n 14, 187.

principles and substantive measures to exclude NNS risks in the planning of activity.¹⁰⁰ However, as “no quarantine service is able to totally prevent the introduction of exotic organisms,”¹⁰¹ some risk is contemplated by all activity and neither State attempts to reduce or limit the scope of scientific activity in the Antarctic. In contrast, scientific activity in the sub-Antarctic is strictly regulated and in some cases, must be justified for the purpose of management goals. However, while both States employ a broad-ranging suite of practical biosecurity measures to protect the sub-Antarctic, the practical constraints with limited budgets and management capacity remain. The potential for State Parties to have more jurisdictional scope in the Antarctic area is offset by the utility of an area put aside for the “public heritage of humankind” and supervised through the diligent inspections of other AT Parties.

Both States’ implementation of PEPAT’s biosecurity provisions in the Antarctic and sub-Antarctic is an attempt to reduce the risk of NNS introduction to “acceptable levels”.¹⁰² Neither States attempt to precisely define the concept,¹⁰³ although both incorporate a level of precaution in assessing the risks associated with NNS to account for uncertainty.¹⁰⁴ In practice, this results in a diligent but uneven approach to biosecurity, with some areas approached with extreme precaution and others neglected.¹⁰⁵

4.2.1.1. GATEWAYS TO ACTIVITY: ENTRY WITH CONDITIONS ATTACHED

PEPAT’s EIA process¹⁰⁶ allows ANZ and the AAD to evaluate planned scientific activities and approve projects conditional on biosecurity measures, although it is limited in its capacity to address

¹⁰⁰ ANZ, *Biosecurity and Non-native species Health, Safety and Environment Policy 7* (2009), 2; AAD, *AAD Environmental Policy* (2009)

<http://www.aad.gov.au/MediaLibrary/asset/MediaItems/ml_402035812268518_Enviro%20Policy%20Poster.pdf> at 28 September 2009.

¹⁰¹ Potter, above n 14, 191.

¹⁰² Potter, above n 14, 191; New Zealand, above n 8, 3.

¹⁰³ Defining an acceptance or appropriate risk in risk assessment is complex, given the essentially political nature of the judgment and the lack of capably excluding all risks: H J Pharo ‘Acceptable Risk in Animal Biosecurity Import Risk Analysis – the limits of rationalism’ (2004) 27 (3) *Public Sector* 8, 12.

¹⁰⁴ New Zealand, above n 8, 1.

¹⁰⁵ Potter, above n 14, 194; see Appendix 6: Biosecurity Measures Employed by Australia and New Zealand in Sub-Antarctic and Antarctic Areas.

¹⁰⁶ PEPAT, Article 8 and Annex I.

cumulative impacts and strategic planning.¹⁰⁷ The advantage of territorial sovereignty is the capacity to prevent entry, demonstrated by environmentally assessed application process that strictly regulate the scope of science permitted in the sub-Antarctic area of both Australia and New Zealand.

4.2.1.1.1. EIA: A LEAKY GATEWAY TO THE ANTARCTIC

The most significant limitation in Australia and New Zealand employing the PEPAT EIA process is admittance of other States' environmental approvals for activities in Australia and New Zealand's disputed Antarctic territories.¹⁰⁸ Although PEPAT requires AT Parties to take into account cumulative impacts of activities, without providing a mechanism for strategic planning, AT Parties are constrained in their impact management by the practices of other AT Parties. An example from the AAT is the initial direct disparity between India's plan to build a station in the Larsemann Hills area and the Larsemann Hills ASMA.¹⁰⁹ Despite AT Parties cooperating to limit cumulative effects, including measures to restrict the spread of NNS, another AT Party decided to unilaterally commence activity in the area. The issue cannot be addressed at the domestic level without undermining the ATS, and requires a strategic approach at the regional level.

The extent to which Australia and New Zealand implement EIA procedures is also limited in applicability to biosecurity. The purpose of Part 3 of the *Antarctic (Environmental Protection) Act 1994* (NZ) is to give effect to Article 8 and Annex I of PEPAT and as such, puts into operation the EIA provisions of the PEPAT. The ambiguous threshold and provision for cumulative impact are not elaborated in the domestic legislation.¹¹⁰ In addition, biosecurity elements of the COMNAP EIA Guidelines are not invoked in the Act. Any applicants are advised to contact MFAT Antarctic Policy Unit who advises on EIA type and content, as well as providing examples of IEE on request.¹¹¹ ANZ

¹⁰⁷ Gilbert, above n 90; Email from Kerry Steinberger, Environmental Officer, AAD to Andrew Phillips, 9 September 2009.

¹⁰⁸ *Antarctic (Environmental Protection) Act 1994* (NZ), Section 23 (EIA); Section 33(2) (Permits); *Antarctic (Environment Protection) Act 1980* (Australia), Section 12C; Section 19AA(c) (NNS Permits).

¹⁰⁹ CEP, Report of the IX CEP (2008), 54-66; India, Establishment of a New Indian Research Base in the Larsemann Hills, East Antarctica ATCM XXIX WP 20 (2008); Australia, China, Romania and Russian Federation, Management Plan for the Larsemann Hills ASMA ATCM XXIX WP 08 (2008).

¹¹⁰ T J Ensminger, L N McCold and J W Webb, 'Environmental Impact Assessment Under the National Environmental Policy Act and the Protocol on Environmental Protection to the Antarctic Treaty' (1999) 21(1) *Environmental Management* 13, 18.

¹¹¹ ANZ; Email from James Walker, Antarctic Policy Unit, MFAT to Andrew Phillips, 28 April 2009.

coordinates the environmental evaluation of EIAs and advises MFAT on potential changes.¹¹² MFAT has extensive powers to prevent or modify the activity proposed.¹¹³ However, the practical consideration of NNS in Antarctic planning is not consistent. ANZ's IEE covers the development, management and execution of the New Zealand Antarctic Programme. The 2008/09 season's IEE analysis of cumulative impacts of the program identifies the understudied "contamination of benthic biota" as a cause for concern¹¹⁴ but does not make explicit reference to the introduction of NNS in this context despite almost all EIA submitted to MFAT making reference to measures taken to avoid introducing NNS.¹¹⁵

In addition, the effectiveness of the EIA in proactively addressing risks associated with New Zealand science is limited by scientists relying on ANZ's biosecurity procedures. Most scientific operators carry out a Preliminary Evaluation, standardised by ANZ into a template.¹¹⁶ The template requires detailing mitigation measures taken to avoid the unintentional introduction of NNS.¹¹⁷ In practice, this often invokes the requirements in the environmental code of conduct¹¹⁸, rather than providing any additional measures to be taken.¹¹⁹ New Zealand has completed two CEEs for scientific projects: the multinational Cape Roberts Scientific Drilling Project and the multinational ANDRILL project. The latter refers to "normal procedures" taken to avoid the possibility of introducing NNS.¹²⁰

The Australian EIA regulations also provide for the Annex I EIA process.¹²¹ Unlike New Zealand, other legislation has an impact on the EIA process, although does not appear to substantively alter the

¹¹² Gilbert, above n 90.

¹¹³ Antarctic (Environmental Protection) Act 1994 (NZ), Section 10.

¹¹⁴ ANZ, *IEE: Development, Management and Execution of New Zealand Antarctic Programme 2008/09*, (2009) <<http://www.ats.govt.nz/documents/EIA/01084enInitial%20Environmental%20Evaluation%20AntNZ%200809%20-%20ex%20appendices.pdf>> at 10 July 2009.

¹¹⁵ Ibid.

¹¹⁶ Gilbert, above n 90.

¹¹⁷ Ibid.

¹¹⁸ "Clean your clothing, boots and equipment before packing them for transport to Antarctica. Pay particular attention to boot treads, velcro fastenings and pockets which could contain soil or seeds" ANZ, above n 102.

¹¹⁹ Gilbert, above n 90.

¹²⁰ M Huston, N Gilbert and J Newman (eds.), *Final Comprehensive Environmental Evaluation for ANDRILL*, ANZ (2006), 20.

¹²¹ Antarctic Treaty (Environmental Protection) (EIA) Regulations 1993, Statutory Rules 1993 No. 115 as amended (Australia).

nature of the obligations under PEPAT.¹²² Guidelines provided by the AAD remain textually close to the ATS guidelines, yet do not explicitly require identification of biosecurity measures.¹²³ The guidelines also stress “indirect and offsite impacts”, indicating the potential application to activities that might introduce NNS.¹²⁴ Similar to ANZ, AAD will apply “conditions” requiring mitigating measures¹²⁵ and it is an offence under the EPBC Act to breach a condition attached to the approval of an activity.¹²⁶ However, the standard template for the Preliminary Assessment, filled out by all non-government organisations, requires consideration of cumulative impacts and the handling of ballast water, as well as mitigation measures, but does not explicitly require the consideration of potential NNS introduction.¹²⁷ Of the 31 IEEs prepared by Australia, only a few of the impact matrixes make reference to the NNS risks involved in the particular activity.¹²⁸ The relevant matrix mentions the introduction of contingency plans and equipment that has since been introduced for stations and field operations.¹²⁹ However, Australia also displays evidence of relying on its quarantine management system rather than consistently identifying NNS issues.¹³⁰ The IEE prepared for the introduction of an air transport network and upgraded organic waste management includes monitoring regimes that do not focus on NNS.¹³¹ This lack of consideration is a further example of the inconsistent application of biosecurity measures across PEPAT tools.

¹²² Potter, above n 14, 189; Fallon and Kriwoken, above n 97, 101; Matters protected by the EPBC Act include “matters of national environmental significance” relevant to the Antarctic and sub-Antarctic: World Heritage properties, National Heritage places, wetlands of international importance, Commonwealth marine areas, “the environment, where actions proposed are on, or will affect Commonwealth land and the environment”, “the environment, where Commonwealth agencies are proposing to take an action.” EPBC Act, Sections 12 to 25.

¹²³ AAD, *Australian Guidelines for preparation of IEEs and CEEs*, <<http://www.aad.gov.au/default.asp?casid=12307>> at 5 August 2009.

¹²⁴ DEWHA (Australia), *Significant Impact Guidelines: Matters of National Environmental Significance*, (2006) EPBC Act Policy Statement 1.1, 8.

¹²⁵ Steinberger, above n 113; Australia, *Australia’s Antarctic Quarantine Practices*, ATCM XXVII, IP 71 (2004), [10].

¹²⁶ EPBC Act, Section 142A; Steinberger, above n 113.

¹²⁷ Australian Preliminary Assessment template: Steinberger, above n 113.

¹²⁸ Australia, *Development and operation of an ongoing air transport system including inter-continental flights between the Australian and Antarctic continents and intra-continental flights between Antarctic stations*: IEE (2005), Appendix 5, ATS EIA Database,

¹²⁹ *Ibid.*

¹³⁰ In place since 2000 for the AAD: Potter, above n 14.

¹³¹ Australia, above n 123.

4.2.1.1.2 PERMITS: A SOLID GATEWAY TO THE SUB-ANTARCTIC

The limitations of the Antarctic jurisdictional approach are demonstrated in the effectiveness of the territorial approaches in the sub-Antarctic where access is strictly regulated, requiring a permit from a relevant authority.¹³² As well as allowing managers to decide whether their research will justify the inevitable risk of NNS introduction,¹³³ the restriction empowers authorities to require biosecurity measures being taken, conditional on the permit.¹³⁴ Both States implement significant precautionary limitations on scientific activity in their sub-Antarctic areas, although with varying degrees of application.

The freedom of passage through marine areas is not restricted in the NZSAI. Anyone is permitted to enter the Auckland Islands Marine Reserve¹³⁵ and scientists may engage in certain non-invasive scientific activities without a permit, exposing the environment to potentially threatening NNS carried on ship surfaces and equipment without required decontamination procedures.¹³⁶ However, certain sampling techniques require permits and allow DOC to place conditions on entry.¹³⁷ New Zealand imposes strict precautions on its scientific activities on the islands: all researchers must apply for a number of permits including an entry permit and an activity or “concession permit” conditional on “ensuring proper quarantine measures”.¹³⁸ Entering the area without this permit is an offence.¹³⁹ Research will only be permitted on certain islands if the science supports management measures and biosecurity is the preeminent management focus of the NZSAI Research Strategy.¹⁴⁰ Quarantine procedures include a day either side of arrival and departure to “pack, clean and quarantine expedition gear”¹⁴¹ at a quarantine store that, in turn, has its own Quarantine Plan

¹³² Macquarie Island Management Plan, 104; HIMI Management Plan, 81; *Reserves Act 1977* (NZ) Section 20(2)(c).

¹³³ *Ibid.*

¹³⁴ NZSAI Research Strategy, 36; HIMI Management plan, [6.4.5].

¹³⁵ *Marine Reserves Act 1971* (NZ), Section 3(2)(d).

¹³⁶ DOC, *Scientific research permits under the Marine Reserves Act 1971*, <<http://www.doc.govt.nz/about-doc/concessions-and-permits/marine-reserve-research-permits>> at 24 August 2009.

¹³⁷ *Marine Reserves Act 1971* (NZ), Section 18(1)(3).

¹³⁸ *Reserves Act 1977* (NZ), Section 57, 59; National Parks Act 1980 (Tasmania), Section 13; DOC, Entry to Nature Reserve/Scenic Reserve/Special Area Application Form/Permit, docDM-504763, 1.

¹³⁹ *Reserves Act 1977* (NZ), Section 94 (2)(d).

¹⁴⁰ NZSAI Research Strategy, Appendix 1: New Zealand’s Sub Antarctic Islands – Information Sheet for Researchers, [35].

¹⁴¹ *Ibid.*, [36]; NZSAI Biosecurity Plan, [2.4.3].

excluding NNS.¹⁴² Waste management, ballast and hull fouling requirements and inspection and monitoring processes are also conditional on the permit.¹⁴³ To “ensure permit conditions, particularly those mitigating quarantine risk...are adhered to”, all visits must be accompanied by a DOC representative.¹⁴⁴ However, the Southland Conservancy Board notes that the quarantine measures are “basic” in comparison to those employed at Macquarie Island,¹⁴⁵ although the accuracy of these comments is disputable.¹⁴⁶

The Australian permit process also incorporates biosecurity measures, but less directly than the New Zealand process. Any scientific research in a Commonwealth reserve without a permit is an offence¹⁴⁷ unless it complies with a management plan for that reserve.¹⁴⁸ This includes the HIMI and Macquarie Marine Reserves. Moreover, the precautionary approach¹⁴⁹ must be considered when granting a permit.¹⁵⁰ As previously mentioned, the EPMO 1987 requires a permit for entry. Macquarie Island is a restricted area under the *National Parks and Reserves Management Act 2002* (Tasmania)¹⁵¹ and as such, also requires a permit for entry. In addition, any research must be approved by the Tasmanian Parks and Wildlife service.¹⁵² Given the permanent AAD station and the role the AAD has in regulating Antarctic and sub-Antarctic science, Tasmanian authorities are limited in their capacity to prevent scientific activity occurring.¹⁵³ However, the AAD operations are as strictly regulated as New Zealand operations, ensuring a quarantine approved premise is used for cargo consolidation and that¹⁵⁴ “all materials, equipment, transport and foodstuffs must be suitably

¹⁴² Island Biosecurity Plan [2.2.1], Appendix 4.

¹⁴³ See below.

¹⁴⁴ DOC, Subantarctic Expeditions: Operational Procedures for Management and Research Expeditions in the New Zealand Sub-Antarctic (2008) docDM-227148, 4.

¹⁴⁵ DOC, *Minutes of a Meeting of the Southland Conservancy Board Held on Saturday 14 February 2009*, (2009), <<http://www.doc.govt.nz/upload/documents/getting-involved/nz-conservation-authority-and-boards/conservation-boards-by-region/southland/scb-minutes-feb-09.pdf>> [12] (V Shaw observations).

¹⁴⁶ See Appendix 1.

¹⁴⁷ EPBC Regulations 2000, Section 12.10.

¹⁴⁸ Ibid, Regulation 12.06(1).

¹⁴⁹ Defined under the EPBC Act 1999, Section 391(2) as “lack of full scientific certainty should not be used a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage”.

¹⁵⁰ EPBC Act 2000, Section 391 (3).

¹⁵¹ *National Parks and Reserves Management Act 2002* (Tasmania), Section 32.

¹⁵² Section 391 (3).

¹⁵³ Potter, above n 67,

¹⁵⁴ Potter, above n 67, 183.

cleaned and/or fumigated.”¹⁵⁵ Permits will not be issued without “a valid deratting certificate or deratting exception certificate recognised by AQIS.”¹⁵⁶ The same level of quarantine is engaged in as the Australian Antarctic operations, including ozone treatment of produce and the use of quarantine detector dogs.¹⁵⁷ The Parks and Wildlife Service also issues permits for the AAD to engage in limited¹⁵⁸ hydroponics operations. They justify the use of NNS, with the lesser reliance on fresh produce on the island, which is a common carrier of NNS.¹⁵⁹ HIMI is virtually pristine and predictably has more stringent quarantine conditions than Macquarie or the NZSAI.¹⁶⁰ As well as most of those applicable to Macquarie, the HIMI Management Plan issues a ban on landing eggs, poultry meat, untreated timber, routing to the island from ports outside Australia¹⁶¹ and wearing ashore outer clothing previously used elsewhere.¹⁶² In addition to these processes, both New Zealand and Australia employ waste management, inspection and monitoring processes and response measures targeting NNS in their Antarctic and sub-Antarctic operations.

EIA processes also play a key role in the sub-Antarctic; both States requiring EIAs for major infrastructure developments and some scientific activities.¹⁶³ The AAD requires sub-Antarctic scientists to go through the same EIA process as Antarctic scientists, although there is no indication any more focus is drawn to biosecurity.¹⁶⁴ A Preliminary Assessment template required before entry into the HIMI Territory assesses impacts of wastes, flora, fauna and ecological functioning as well as assessing whether the impacts will be cumulative and significant, but does not explicitly identify NNS.¹⁶⁵ Moreover, the EPBC Act 1994 assessment and approval provisions apply to those activities which will or are likely to significantly impact world heritage areas.¹⁶⁶ This is likely to have application to infrastructure development and allows DEWHA to make an informed judgment on the impact of

¹⁵⁵ Macquarie Island Management Plan, 98.

¹⁵⁶ HIMI Management Plan, 6.4.6, 70.

¹⁵⁷ Potter, above n 67, 181.

¹⁵⁸ Less seeds are allowed than in the Antarctic hydroponics operation and must be approved by the Tasmanian Parks and Wildlife Service.

¹⁵⁹ Potter, above n 67, 181; AAD ‘Hydroponics’, <<http://www.aad.gov.au/default.asp?casid=24377>> (20/11/2008).

¹⁶⁰ Potter, above n 67.

¹⁶¹ Discussed in more detail in 2.5.

¹⁶² Potter, above n 67, 183.

¹⁶³ de Villiers, above n 49, 125.

¹⁶⁴ Steinberger, above n 113.

¹⁶⁵ *Preliminary Assessment of Environmental Impacts*, accessed 10 September 2009, <http://www.aad.gov.au/MediaLibrary/asset/MediaItems/ml_388424142476852_HIMI%20PA%20FORM.pdf>.

¹⁶⁶ EPBC Act 1994 (NZ), Section 12.

an action.¹⁶⁷ However, the impact assessment and evaluation of scientific utility provided through the permit process is a more effective barrier to exposing the sub-Antarctic to NNS than those employed in the Antarctic.

4.2.1.2. PROTECTING SENSITIVE AREAS: PERFECTING THE BALANCE

The balance between the limitations of jurisdiction by nationality and the problems with territorial sovereignty over an area are demonstrated in the domestic management of special areas. Under New Zealand and Australian law, the whole of the Antarctic area is a “natural reserve”.¹⁶⁸ While the protection afforded is less than is provided in domestic national parks and reserves, collective management allows for different perspectives on a common goal.¹⁶⁹

In particular, the ATS process allows AT Parties to propose sites for management. Twenty-seven ASPAs are in place in the AAT and Ross Dependency and 2 ASMAs, approximately 78% of which were originally proposed by Australia or New Zealand.¹⁷⁰ Entering a protected area or acting contrary to the Management Plan for an ASMA or ASPA is an offence under the *Antarctic (Environmental Protection) Act 1994* (NZ) and the *Antarctic (Environmental Protection) Act 1980* (Australia),¹⁷¹ allowing any AT Party to limit activity and enforce NNS measures that must be applied by New Zealand and Australian operators.¹⁷² Where appropriately implemented, this also means other AT Parties will legislate and enforce measures proposed by Australia and New Zealand once the consultation process is completed.¹⁷³ The CEP process provides for consistency but the variety of sources removes the potential for bias in a single State’s approach. The high percentage of input from the territorial claimant State illustrates the relevance and importance of the frozen territorial

¹⁶⁷ DEWHA, EPBC Act – *Environment Assessment Process*, (2007), <<http://www.environment.gov.au/epbc/publications/pubs/assessment-process.pdf>> at 10 October 2009.

¹⁶⁸ Through domestic implementation of the Protocol; *Antarctic (Environmental Protection) Act 1994* (NZ), Schedule 2; *Antarctic (Environmental Protection) Act 1980* (Australia), Schedule 3.

¹⁶⁹ See Appendix 6: Biosecurity Measures employed by Australia and New Zealand in Sub-Antarctic and Antarctic Areas.

¹⁷⁰ AT Secretariat, *Antarctic Protected Areas Database*, <http://www.ats.aq/devPH/apa/ep_protected.aspx?lang=e> at 19 November 2009 (Of the 27 ASPAs protected in the AAT and Ross Dependency, 10 were originally proposed by New Zealand and 11 were proposed by Australia. In addition, Australia collaborated in the Larsemann Hills ASMA, and New Zealand in the McMurdo Dry Valleys ASMA.

¹⁷¹ *Antarctic (Environment Protection) Act 1994* (NZ), Section 34-7; *Antarctic (Environmental Protection) Act 1980*, Section 19 (e)-(g).

¹⁷² Discussed in detail in Chapter 2, Section 2.2.1.3.

¹⁷³ *Ibid.*

claims in protecting the area. Significant restrictions limit activity and research in the areas. For example, in the New Zealand nominated Sabrina Island, researchers must demonstrate a “compelling scientific purpose which cannot be served elsewhere.”¹⁷⁴ However, the biosecurity content of the area plans and implementation by AT Parties remains inconsistent.¹⁷⁵

Certain parts of the NZSAI, Macquarie Island and HIMI Territory are limited to researchers and require additional permitting processes and quarantine measures for access.¹⁷⁶ The limitation of access reduces the risk of NNS introduction by creating baseline monitored and excluded biological communities. The NZSAI CMS categorises the NZSAI into “minimum impact” (pristine) and “refuge” islands¹⁷⁷ based on their “ecosystem condition and vulnerability to disturbance,”¹⁷⁸ which is defined according to the presence or absence of non-native mammals.¹⁷⁹ The only research permitted on a minimum impact island is “for essential management purposes and can include monitoring of changes and identification of biological values.”¹⁸⁰ The Macquarie Island management plan limits access to certain times of the year and requires additional permits to enter “Special Management Areas” to protect breeding species and their habitat.¹⁸¹ The island is also zoned, with two zones allocated for servicing scientific operations, one just for approved data collecting and management programs and the other allowing in addition the erecting of infrastructure.¹⁸²

The sub-Antarctic’s designation under several international conventions highlights the utility of international designation in protecting areas. All of the areas are protected as “Natural World Heritage Areas”¹⁸³ under the *World Heritage Convention* creating an obligation to report on threats to the natural values of areas to the international forum.¹⁸⁴ In addition, domestic legislation creates

¹⁷⁴ Management plan for ASPA No. 104, Sabrina Island, Northern Ross Sea, ATCM XXXII Measure 3 (2009), 4.

¹⁷⁵ See Chapter 2, Section 2.2.1.3.

¹⁷⁶ NZSAI CMS, 39; Macquarie Island Management Plan, 85; HIMI Management Plan, 35.

¹⁷⁷ Most of the NZSAI is categorised as “minimum impact”; the refuge islands are Auckland, Enderby and Masked Island in the Auckland Island Group and Campbell and Folly in the Campbell Island Group.

¹⁷⁸ NZSAI CMS, 39.

¹⁷⁹ NZSAI Research Strategy 2005, 8.

¹⁸⁰ Ibid.

¹⁸¹ Macquarie Island Management Plan, 85.

¹⁸² Ibid, 72.

¹⁸³ Potter, above n 14, 186; Macquarie Island Management Plan 4.6, 46, Heard Island Management Plan 2.6, 19; UNEP, *The New Zealand Sub-Antarctic Islands*, <<http://www.unep-wcmc.org/sites/wh/pdf/NZ%20Sub-Antarctic%20Is.pdf>> at 14 July 2009.

¹⁸⁴ See above, Chapter 3, Section 3.2.1.2.

additional responsibilities for internationally protected areas.¹⁸⁵ The EPBC Act requires all zones within Commonwealth reserves and Commonwealth reserves to be categorised according to the IUCN system.¹⁸⁶ The EPBC Regulations state that strict nature reserves should be managed primarily for scientific research and environmental monitoring and public access may be limited.¹⁸⁷ IUCN management principles adopted by the EPBC Regulations include the precautionary principle “where there is a threat of serious or irreversible damage” and ecologically sustainable use, where “the benefit of the use of the present generation should not diminish the potential or of the reserve to meet the needs and aspirations of future generations.”¹⁸⁸ The territory and the marine area of the HIMI reserve are also zoned and all seven areas are categorised as strict nature reserves and although not listed, the areas are managed according to Ramsar principles.¹⁸⁹ The World Heritage listing and the application of international conservation principles has significant implications on how the areas are treated and invokes international reporting standards promoting compliance.¹⁹⁰

4.2.1.3. WASTE SYSTEM: INTRODUCING NNS INTO THE ANTARCTIC ENVIRONMENT SINCE 1959

The presence of permanent bases in the Antarctic and regular scientific activity means a large amount of potentially NNS-hosting waste. The ATS does not require the removal¹⁹¹ but most of that waste, including the biologically sensitive waste, is removed or incinerated in the Australian and New Zealand operations.¹⁹² However, it is the one aspect of the two State’s operations where NNS are indirectly but intentionally released into the Antarctic environment.¹⁹³ New Zealand and Australia treat and pump sewage into the waters surrounding Antarctica and New Zealand allows field parties

¹⁸⁵ EPBC Act 1994, Schedule 6, 8.

¹⁸⁶ Ibid, Section 347(1).

¹⁸⁷ *EPBC Regulations 2000*, Schedule 8, “Strict Nature Reserve”.

¹⁸⁸ EPBC Regulations, Schedule 8 (5)(b).

¹⁸⁹ HIMI Management Plan, 35; EPBC Regulations 2000, Schedule 6 (Australian Ramsar Management Principles), EPBC Regulations 2000, Schedule 8.

¹⁹⁰ See above *Chapter 3, Section 3.2.1.2*.

¹⁹¹ Antarctic (Environmental Protection) Act (NZ) 1994, Section 35; Antarctic (Environmental Protection) (Waste Management) Regulations 1994 (Australia).

¹⁹² ANZ, *Waste Management Handbook* (2007), <http://www.antarcticanz.govt.nz/downloads/environment/Waste_Manual0708LR.pdf> at 12 August 2009 (‘ANZ Waste Handbook’), Appendix II; AAD, *Waste Management* (2009), <<http://www.aad.gov.au/default.asp?casid=755>> at 12 August 2009.

¹⁹³ PEPAT, Articles 2 to 7 of Annex III, *Antarctic (Environmental Protection) (Waste Management) Regulations 1994* (Australia), *Antarctic (Environmental Protection) Act 1999* (NZ), Section 34-37.

to directly dispose of sewage into the ocean.¹⁹⁴ The reason Annex III does not prohibit the release of NNS into the Antarctic environment is because entirely removing the wastes or completely eliminating NNS is currently unfeasible.¹⁹⁵ Scott Base's treatment system, including ultra violet disinfection before disposal, mitigates against the biosecurity threat but does not remove it entirely.¹⁹⁶ Australia removes its sludge from the sewage plants for disposal in Australia and is trialling the introducing of UV sterilisation to all stations.¹⁹⁷

In contrast, waste management is not treated as a significant risk in the sub-Antarctic and lesser standards are employed. Similar to the Antarctic, NNS are intentionally but indirectly introduced into the environment through human and food waste. Unlike the HIMI and NZSAI, Macquarie Island has to deal with the waste from a permanently occupied base. The Macquarie Management Plan requires the treatment of sewage and grey water with maceration and releasing it into the ocean, "until such time that an alternative method is available."¹⁹⁸ However, quarantine standards are introduced for risky products: waste foodstuffs, plants or plant material which may germinate and sprout must be disposed of in a way previously approved that will ensure they will not "grow in the reserve."¹⁹⁹ Poultry products or brassica²⁰⁰ waste may not be disposed into the waters of the reserve.²⁰¹ The HIMI management plan includes similar provisions, although provides for the reasonable disposal obliquely. All waste must be securely stored during a visit and then removed on departure²⁰² apart from human wastes which must be either incinerated according to the approved procedure or "disposed where rapid marine dispersal is possible or at least in a way that minimises

¹⁹⁴ ANZ Waste Handbook, 31; Australia, *Upgrade of organic waste management equipment, procedures and associated infrastructure at Australia's Antarctic stations: IEE* (2008), ATS EIA Database, <http://www.ats.aq/documents/EIA/01090enUpgrade%20of%20organic%20waste%20management%20IEE_final2_mt08.pdf> 1 August 2009, 14.

¹⁹⁵ See Chapter 3; Australia, *ibid*, 31-32.

¹⁹⁶ New Zealand, *IEE for Scott Base Wastewater Treatment* (2001) EIA Database, <<http://www.ats.aq/documents/EIA/00550enFinal%20IEE%20WWTP.pdf>> 7.

¹⁹⁷ Australia, *Upgrade of organic waste management equipment, procedures and associated infrastructure at Australia's Antarctic stations: IEE* (2008), ATS EIA Database, <http://www.ats.aq/documents/EIA/01090enUpgrade%20of%20organic%20waste%20management%20IEE_final2_mt08.pdf> 1 August 2009, 14.

¹⁹⁸ Macquarie Island Management Plan, 117.

¹⁹⁹ Macquarie Island Management Plan, 99.

²⁰⁰ The brassica family includes swedes, turnips, cabbage, brussel sprouts, cauliflower, broccoli, and mustard seed.

²⁰¹ Macquarie Management Plan, 99.

²⁰² HIMI Management Plan, [6.3.6].

impacts on wildlife, water bodies and vegetation.”²⁰³ In practice, operational considerations might override any serious consideration of potential NNS introduction, without clear directions on how to dispose of waste.

The NZSAI Quarantine Plan is even less strict, allowing toilet and biodegradable wastes to be buried fifteen centimetres deep or disposed of at sea.²⁰⁴ In contrast, the NZSAI Expedition Procedures require all biodegradable rubbish to be removed from the islands.²⁰⁵ Additional precautions must be taken with high risk foods²⁰⁶ that must be removed from the islands.²⁰⁷ At the time of writing, the discrepancies between the NZSAI Quarantine Plan and Expedition Procedures are in the process of being revised.²⁰⁸ Moreover, no waste disposal is permitted in the Auckland Island Marine Reserve.²⁰⁹

4.2.1.4. PREVENTING NNS IN THE MARINE ENVIRONMENT

The paucity of marine biosecurity provisions in the international and regional legal framework puts a particular onus on AT Parties taking proactive approaches to the issue. Both Australia and New Zealand employ specific biosecurity measures to their Antarctic and sub-Antarctic activity, although do not extend the precautionary approach demonstrated in their approach to terrestrial NNS. In addition, vessels supplying the Australian and New Zealand NAPs will usually dock in Australian and New Zealand ports prior to departure to the Antarctic and are subject to the significant domestic controls on marine NNS.²¹⁰ However, most of these regulations focus on the potential damage to domestic biosecurity and although offering effective protection to the sub-Antarctic areas, the Antarctic is left relatively unprotected.

²⁰³ HIMI Management Plan, [6.3.8].

²⁰⁴ NZSAI Quarantine Plan, [2.9.7].

²⁰⁵ DOC, above n 144, 23.

²⁰⁶ The examples given: potatoes, seeds, egg shells (NZSAI Quarantine Plan, [2.9.7]).

²⁰⁷ Ibid.

²⁰⁸ Email from Peter McClelland, Senior Conservation Officer, DOC to Andrew Phillips, 23 November 2009.

²⁰⁹ NZSAI Quarantine Plan, 2.9.7; *Marine Reserves Act 1971*, Section 5(a).

²¹⁰ M McConnel, *Globallast Legislative Review Final Report*, GloBallast Monography Series No.1 (2002), 71, 80.

Other than implementing responsibilities under Annex IV of the AT, relevant sections of the IMO Pollution Conventions²¹¹ and recommending consistency with the Practical Guidelines for Ballast Exchange in the AT Area,²¹² Australia does not take any formal measures to minimise the risk of introduction of NNS into the Antarctic environment from ballast water or bio-fouling. However, Australia has developed a strategic focus on managing NNS in the marine environment with a Centre for Research on Introduced Marine Pests introduced in 1994 and a cooperative interstate agreement in 2005.²¹³ The National Introduced Pests Coordination Group, with partners from government, industry and environmental NGOs, is responsible for implementing the agreement and has been involved in the production of a number of guidelines with relevance to the biofouling of ship surfaces. In contrast, New Zealand expressly addresses the protection of the Antarctic marine environment with specific conditions into its permits for fisheries and tourist operations in the Antarctic.²¹⁴ Both are also in the process of developing ballast water management practices to ratify the Ballast Water Convention.²¹⁵

The current system employed by both countries is consistent with the comparatively lower standards of IMO's Ballast Water Guidelines.²¹⁶ Although neither country permits the discharge of untreated ballast water or sediment into their territorial seas,²¹⁷ open water ballast water exchange

²¹¹ Antarctic (Environmental Protection) Act 1994 (NZ), Section 54; Maritime Transport Act 1994 (NZ), Marine Protection Rules, Part 160 – Prevention of Pollution by Sewage from Ships in the Antarctic Treaty Area (effective 20 August 1998); Part 170 – Prevention of Pollution of Garbage from Ships and Offshore Installations (effective 30 July 2009) (NZ); Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (Australia), Section 26BA-BC – Discharge of sewage in the Antarctic Area; Section 26F(8) – Discharge of garbage in the Antarctic Area.

²¹² Gilbert, above n 90; COMNAP and IAATO, *Information Paper on the Use of Ballast Water*, ATCM XXVIII IP 121 (2005).

²¹³ *Intergovernmental Agreement on a National System for the Prevention and Management of Marine Pests Incursions* (signed on 15 April 2005), <http://www.marinepests.gov.au/__data/assets/pdf_file/0007/772864/Marine_IGA.pdf> at 5 June 2010.

²¹⁴ Potter, above n 14, 189; see below, section 4.4.

²¹⁵ Department of Infrastructure, Transport and Regional Development and Local Government (Australia), *Ballast Water Management* (2008), <<http://www.infrastructure.gov.au/maritime/environment/ballast.aspx>> at 4 November 2009 (Australia has signed the BWM Convention); Ministry of Foreign Affairs and Trade (NZ), *International Treaties List as at January 2010* (2010) 11.

²¹⁶ IMO, IMO Voluntary Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens, IMO Assembly Resolution A.868 (20) (1998) ('IMO Ballast Water Guidelines').

²¹⁷ MAFBNZ, *Import Health Standard for Ships' Ballast Water from All Countries Issued pursuant to Section 22 of the Biosecurity Act 1993*; (13 June 2005), <<http://www.biosecurity.govt.nz/files/ih/ballastwater.pdf>>, [5.1]; AQIS, Australian Ballast Water Requirements, Version 4 – March 2008, <http://www.daff.gov.au/__data/assets/pdf_file/0004/713884/bw-requirements.pdf>, 10.

is accepted as the most common treatment,²¹⁸ using the methods prescribed by the IMO.²¹⁹ The limited effectiveness of the open water ballast exchange method or limiting discharge in sensitive high seas areas are not provided for under the regulations. The compliance mechanisms include pre-arrival notification to the biosecurity agency²²⁰ and if ballast water is being exchanged in domestic waters, reporting criteria²²¹ effectively protect domestic waters but do little to offer a buffer to the Antarctic. However, the focus is on domestic protection. Neither provides any restrictions around the uptake of water in sensitive areas, urged in the Ballast Water Guidelines.²²² Moreover, New Zealand's existing measures are focussed on the process of open water exchange encouraging token compliance, rather than the Ballast Water Standard provided under the BWM Convention.²²³ This reduces the utility of the area of a buffer, in particular not deterring against the uptake of NNS from the New Zealand or Australian environments. New Zealand and Australia's imminent implementation of the additional requirements of the BWM Convention will go some way to minimise the risks surrounding the uptake of ballast water with NNS.²²⁴ However, New Zealand has expressly declared, if ratified, it will exercise its right under the BWM Convention and not apply the strict standards to ships registered in New Zealand and operating within waters under its jurisdiction.²²⁵ As the BWM Convention also permits an exemption for vessels operating between

²¹⁸ T J Dodgshun, M D Taylor, and B M Forrest, 'Human Mediated pathways for spread of non-indigenous marine species in New Zealand', *DOC Research & Development Series 266* (2007), 13; MAFBNZ, *Import Health Certificate for Ballast Water*, Issued pursuant to *Biosecurity Act 1993*, Section 22 (2005), 2-3; AQIS, *Australian Ballast Water Requirements* (Version 4, 2008), 6.

²¹⁹ IMO Ballast Water Guidelines, Appendix II [9.2.1]; c.f. an additional method is accepted by the Australians (the Dilution method), AQIS, above n 226, 10.

²²⁰ MAFBNZ, above n 226, [5.3]; AQIS, above n 226, 4; In addition, the state of Victoria requires prior authorisation to discharge ballast in its ports: *Environmental Protection (Ship's Ballast Waters) Regulations 2006* (Victoria).

²²¹ MAFBNZ, above n 226, [5.6]; AQIS, above n 226, 7.

²²² IMO, above n 215, [9.1.1].

²²³ MAFBNZ, 'New Zealand's response to the International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004; Summary and Analysis of Submissions on Discussion Paper' (2008), <<http://www.biosecurity.govt.nz/files/biosec/consult/ballast-water-subs.pdf>> at 4 September 2009, [5] (DOC and Aquaculture New Zealand comments).

²²⁴ *Ballast Water Convention*, Article 2(8), Regulation D-2 (see Chapter 3); Australian Government Department of Infrastructure, Transport and Regional Development and Local Government, *Ballast Water Management*, <<http://www.infrastructure.gov.au/maritime/environment/ballast.aspx>> (2008).

²²⁵ MAFBNZ, above n 223, 6.

flag states and the high seas, it is unclear whether New Zealand intends to apply this exemption to ships operating in Antarctic waters.²²⁶

Reflecting the lack of guidance from the international system, neither New Zealand nor Australia has binding rules regulating bio-fouling. However, both Australia and New Zealand have analysed the risks associated with hull fouling and introduced non-binding guidelines to address the elimination of NNS risks.²²⁷ However, the implementation of any binding restrictions without international agreement is unlikely²²⁸ and the AFS Convention does little to enforce alternative treatment options.²²⁹ Some progress has been made towards regulating alternative treatment-technologies to minimise the risk of introducing NNS.²³⁰ The Australian and New Zealand Environment and Conservation Council ('ANZECC') prepared a code of practice in response to perceived risks surrounding the in-water treatment of hulls.²³¹ Prior to undertaking any in-water cleaning, approval must be gained from the relevant state/territory authority and conditions may be imposed under the Code. In particular: no debris removed must be allowed to pass into the water column.²³² Unfortunately, the risks surrounding in water cleaning may not exceed a fouled hull and the regulations may increase the likelihood of introducing NNS without adequate treatment facilities, which are costly to maintain and offer some significant operational hurdles.²³³ The ANZECC code is currently under review because of these issues.²³⁴

²²⁶ K N Scott, 'Defending the world below the brine: Managing alien invasive species under the 2004 BWM Convention – A New Zealand perspective', (2008) 14 *Journal of International Maritime Law* 308, 329.

²²⁷ S Showalter and J Savarese, 'The Existing US Legal Regime to Prevent the Hull Transport of Aquatic Invasive Species', A White Paper commissioned by the California Sea Grant Extension Program (2004), 9; MAFBNZ, *Clean Boats-Living Seas* (2008), <<http://www.biosecurity.govt.nz/files/enter/ships/clean-boats-brochure.pdf>> in 20 August 2009; Australia, 'National Biofouling Management Guidelines for Recreational Vessels' (2009).

²²⁸ R F Piola, K A Dafforn and E L Johnston, 'The influence of antifouling practices on marine invasions', (2009) 25(7) *Biofouling* 633, 641, c.f. New Zealand's Sub-Antarctic and Antarctic Certification process to eliminate biofouling below.

²²⁹ Piola, *ibid*, 641.

²³⁰ See for example: Aquenal Pty Ltd., *A yacht enclosure system to mitigate biosecurity risks associated with biofouling*, MAFBNZ Technical Paper No 2009/41 (2009)

²³¹ ANZECC, *Code of Practice for Anti-Fouling and In-water Hull Cleaning and Maintenance*, (1997), <<http://www.environment.gov.au/coasts/pollution/antifouling/code/pubs/code.pdf>> at 19 September 2009; G A Hopkins and B M Forrest, 'Management options for vessel hull fouling: an overview of risks posed by in-water cleaning,' (2008) 65 *ICES Journal of Marine Science* 5.

²³² ANZECC, *ibid*, 4.

²³³ Dodgson, above n 218, 15; Australian Shipowners Association, *Assessment of Introduced Marine Pest Risks Associated with Niche Areas in Commercial Fishing*, Final Report (Jan 2007), <<http://www.asa.com.au/>

Occasionally, the sub-Antarctic poses an additional buffer for scientific vessels, particularly Macquarie Island which is sometimes supplied on the way to Australia's continental bases.²³⁵ New Zealand's approach to sub-Antarctic marine protection is outlined in the Marine Protected Areas Policy and Implementation Plan.²³⁶ The protection of NZSAI marine areas is currently in the consultation stage and the risk of bio-invasion is identified as a priority area.²³⁷ Currently DOC has no jurisdiction over ships sailing or anchoring near most of the sub-Antarctic islands²³⁸ but the New Zealand prohibition on discharging ballast without preapproval apply to the sub-Antarctic and it is very unlikely approval would be given to any discharge proximal to a sub-Antarctic island. In 2006, invasive Asian seaweed was found at the Snares Islands.²³⁹ Since then permits to land on the NZSAI are conditional on being inspected and certified clean less than 28 days before landing on the island.²⁴⁰ These provisions will not be effective until biosecurity protection is extended to the territorial seas of all the sub-Antarctic islands.

In contrast to New Zealand's marine protected areas, the Macquarie Island Management Plan specifically prohibits the discharge of any ballast water within the territorial sea.²⁴¹ The policy also urges protection against hull fouling.²⁴² To ensure this, Tasmanian officials "ensure that any small boats or barges have undergone hull inspection and thorough cleaning prior to entering the waters of the reserve."²⁴³ The HIMI Management Plan utilises zoning restrictions to prohibiting ballast water exchange or discharge within the territorial sea or "inner marine zone".²⁴⁴ It also requires all vessels, small craft and ship's equipment regularly in contact with the water to be treated or cleaned to

Final%20Report%20on%20the%20Commercial%20Vessels%20Biofouling%20Project_with%20images.pdf> at 4 November 2009, 23.

²³⁴ Ibid.

²³⁵ AAD, *Shipping Schedule for Season 2009/10*, Voyage 4 – Ship: *Aurora Australis* (25-Sep-2009), <<http://its-db.aad.gov.au/proms/public/schedules/voyage.cfm?season=0910#V4>> at 25 November 2009.

²³⁶ DOC and MFish, (NZ) *Marine Protected Areas: Classification, Protection Standard and Implementation Guidelines* (2008) <<http://www.biodiversity.govt.nz/pdfs/seas/MPA-classification-protection-standard.pdf>> at 2 October 2009, 39

²³⁷ Ibid, 39.

²³⁸ NZSAI CMS, 82; Hopins and Forrest, above n 238, 17.

²³⁹ MAFBNZ, *Review of the Undaria Commercial Harvest Policy*, MAF Biosecurity new Zealand Discussion Paper No: 2009/02, 1.

²⁴⁰ DOC, *Sub Antarctic Vessel Inspection Certificate*, DOC/DM-229518 (2008).

²⁴¹ Macquarie Island Management Plan, 77 (the territorial sea governed by the plan: 3 nautical miles from the coast).

²⁴² Ibid, 77.

²⁴³ Although Potter notes this is a provision that is unlikely to be implemented (Above n 67, 182).

²⁴⁴ HIMI Management Plan, 6.3.16, 64.

eliminate fouling communities.²⁴⁵ Various hull fouling management measures have been recommended for ships likely to operate in the Macquarie Island Marine Park,²⁴⁶ including in-water hull cleaning, annual dry-docking and offseason lay-up in fresh water.²⁴⁷ The high costs, impracticalities and difficulty in meeting ANZECC standards make the practical implementation of these recommendations unlikely.²⁴⁸ Nevertheless, the *Biosecurity Act 1993* and *Quarantine Act 1908* empower biosecurity officers and quarantine officers to board and if the ship is suspected of breaching ballast water management practices or being in an “insanitary condition” to detain without warrant.²⁴⁹ Moreover, it is likely with the implementation of the Ballast Water Convention and increasing protection shown to Highly Valued Areas,²⁵⁰ further protection will be afforded the sub-Antarctic marine areas, particularly surrounding the NZSAI. Similar provisions could have utility in the Antarctic, although AT Parties can only implement provisions in relation to their own vessels.

4.2.1.5. PLANNING TO RESPOND

Once a NNS is identified in the Antarctic environment, PEPAT creates an obligation for Parties to remove or dispose of it,²⁵¹ especially if the incident is classified as an environmental emergency.²⁵² The preparation of contingency plans is also required as part of the Annex II permitting-process but overall, PEPAT lacks a strategic reactive component to NNS issues. This poses a particular issue where many States are operating in the same area and States are only responsible for their own activities. In the sub-Antarctic, confused jurisdictional arrangements have resulted in significant debate over the cost of response measures.²⁵³ The lack of “ownership” could be particularly difficult in the context of a larger invasive incident in the Antarctic, especially where high costs are involved. There is no additional provision in either Australia or New Zealand’s domestic legislation for the Antarctic that provides any obligations around the response to NNS introduction. Both have policy

²⁴⁵ Ibid, 6.4.17, 70.

²⁴⁶ P N Lewis and R Summerson, *Assessing the Risks of Invasion by Marine Pests of Macquarie Island* DEWHA (2005).

²⁴⁷ Potter, above n 67, 185.

²⁴⁸ Ibid, 105.

²⁴⁹ *Biosecurity Act 1993*, Section 106-129; *Quarantine Act 1908*, Division 2.

²⁵⁰ Dodghson, above n 218, 35.

²⁵¹ See Chapter 2, Section 2.3.1; PEPAT, Annex II, Article 4(5).

²⁵² As envisioned in Article 15 of the Protocol; See Chapter 2.3, when the Annex VI comes into force, it will also arguably create strict liability for failing to respond to introductions that result in environmental damage.

²⁵³ Potter, above n 67, 187.

that deals with the issue substantively, although largely rely on reactive management plans. The limited international provision for response is nevertheless fully implemented in the sub-Antarctic. Short term contingency measures exist to address NNS once identified and long term management plans are in place for some of the existing NNS.

The domestic framework for New Zealand provides integrated response structures at various levels of governance.²⁵⁴ Australia is in the process of better integrating its response processes through AusBIOSEC.²⁵⁵ However, in the Antarctic, it is the Australian program that has developed practical contingency plans and prepared kits for the introduction of NNS.²⁵⁶ New Zealand has not yet put any procedures or contingency measures into place to respond to a potential invasion in the Antarctic, although the ANZ Biosecurity Policy does provide for “monitoring and control systems (e.g. traps) [being] maintained as required”.²⁵⁷ Australia has several systems in place to ensure sufficient analysis is performed on any observed non-native species or animal disease outbreak. Each station, ship and major field camp is provided an “Unusual Animal Mortality Response kit” and an alien invertebrate collection kit, providing all the requisite materials to collect data in the field or station on observation of an alien species.²⁵⁸ Moreover, expeditoneers are required to utilise the AAD’s incident reporting scheme to report discoveries of introduced species, soil contamination of equipment and supplier non-compliance with environmental requirements.²⁵⁹ However, neither provide for practical response measures to be evaluated and decided in the case of introduction.

Given the considerable costs of sub-Antarctic extermination,²⁶⁰ all the sub-Antarctic islands have contingency plans in case of invasive introductions. In particular, the AAD has developed a particular plan to deal with “unusual animal deaths or disease outbreaks.” In the interim between preparing a tailored response to the issue, the AAD will rely on the Draft Response Plan for the Discovery of

²⁵⁴ MAFBNZ, Policy for MAF’s Responses to Risk Organisms (2008),
<<http://www.biosecurity.govt.nz/biosec/pol/statements/response-policy/response>>.

²⁵⁵ Australia, *Fourth National Report to the CBD* (2009), 79: for example, 39 (National System for the Prevention and Management of Marine Pest Incursions, emergency preparedness and response element).

²⁵⁶ See below.

²⁵⁷ ANZ Biosecurity Policy, 2.

²⁵⁸ Australia, ‘Australia’s Quarantine Practices’, XXVII ATCM (2004), [16].

²⁵⁹ *Ibid*, [15].

²⁶⁰ See above n 4.

Unusual Animal Deaths.²⁶¹ Standing permits exist for the collection of sick or dying animals,²⁶² site access must be immediately restricted for containment²⁶³ and a response team must be immediately set up to take further action.²⁶⁴ This is supported by the Macquarie and HIMI Management plans, which introduce specific contingency plans in the case of introductions and long term strategy for the control of established NNS.²⁶⁵ Importantly, while both introduce hierarchical approaches to the management of NNS based on eradication, surveillance and control, the need to consider proportional response is highlighted in the HIMI plan.²⁶⁶ The eradication of cats on Macquarie has arguably led to more severe ecological damage than posed by the NNS and highlights the need to take measured and proportional response to established NNS.²⁶⁷ Any eradication operation in a Commonwealth Reserve must engage in the EIA approval process of the EPBC Act 1999, as well as the Australian Pesticides and Veterinary Medicines Authority.²⁶⁸ However, the considerable costs associated with long term control and overlap in jurisdiction has limited management steps on Macquarie Island.²⁶⁹ The issues forecast the potential difficulties AT Parties will face if a NNS invades the Antarctic and highlight the need to establish clear international contingency plans for all possible situations.

implemented quickly.²⁷² The lack of immediate measures, including restricting access to the areas and stand-by permits, as provided for in the AAD Draft Response Plan for the Discovery of Unusual Animal Deaths, is a weakness in the plan but is mitigated by the fast-tracked procedure for management. The NZSAI Operational Procedure also requires the management of NNS plants by scientific expeditions to the islands. In the case of identification, it provides for directly reporting the incident and potential first response contingency measures that can be employed under direction and approval of DOC.²⁷³ Moreover, weed management kits are in place for all of the sub-Antarctic islands.²⁷⁴

4.2.2. ALL EYES OPEN: EDUCATION, SURVEILLANCE AND INSPECTIONS

Both Australia and New Zealand implement significant administrative and criminal sanctions for breaching the implementing legislation.²⁷⁵ However, education and effective surveillance are the most important aspects of compliance in the isolated Antarctic area.²⁷⁶ Monitoring and inspection processes are the only mechanisms created by PEPAT to ensure compliance with domestic biosecurity policy and PEPAT and comprehensive implementation should also ensure that any introductions into frequently used areas in the Antarctic are identified promptly. At the points of entry into the continent, New Zealand and Australia collaborate with domestic biosecurity agencies to inspect and decontaminate Antarctic-bound materials to ensure compliance with biosecurity objectives.²⁷⁷ However, in the Antarctic area, monitoring is the responsibility of the proponent of activity and although inspection processes provide additional objective analysis of activities, these are not designed to specifically identify risks associated with NNS.²⁷⁸ Sub-Antarctic operations have much more comprehensive monitoring processes and target the issues associated with self-regulation by introducing third party inspections.

²⁷² NZSAI Island Biosecurity Plan, 41, Figure 2.

²⁷³ DOC, above n 144, 25.

²⁷⁴ NZSAI Biosecurity Plan, Appendix 5: Pre-prepared island contingency plans, 57.

²⁷⁵ *Antarctic (Environment Protection) Act 1980* (Australia) Sections 19-21A; *Antarctic (Environmental Protection) Act 1994* (NZ) Section 10, 24, 33, 37, 47. The offence of introducing a NNS without a permit carry 2 years and/or “120 penalty units” (\$132,000 according to *Legislation Act 2001* (Australia)) for Australian legislation (Section 19(1)(b)) and 6 months and/or “\$100,000 in the New Zealand legislation (Section 33(1)).

²⁷⁶ K Bastmeijer, *the Antarctic Environmental Protocol and its Domestic Legal Implementation* (2003), 367.

²⁷⁷ Potter, above n 14, 187; ANZ, *Biosecurity and Non-native species* Health, Safety and Environment Policy 7 (2009), 2.

²⁷⁸ See Chapter 2, Section 2.2.

Within the domestic framework, both New Zealand and Australia closely monitor all major pathways into their countries.²⁷⁹ Border control is the focus of surveillance mechanisms in both jurisdictions but New Zealand is also developing a comprehensive biosecurity surveillance strategy to identify pests and diseases accidentally introduced into the New Zealand environment.²⁸⁰ Both States' sub-Antarctic management processes involve a number of targeted NNS monitoring processes.²⁸¹ The World Heritage status of the sub-Antarctic islands²⁸² put a particular onus on Australia and New Zealand to monitor areas of high risk for NNS presence.²⁸³ In the NZSAI, DOC engages in independent monitoring and requires scientists to replenish rodent monitoring stations and gather incidental observations and data on NNS.²⁸⁴ Both the Macquarie Island and HIMI Plans require the AAD to perform NNS monitoring activities.²⁸⁵ The HIMI Territory puts a particular onus on the AAD to engage in regular comprehensive surveys and laying of rodent bait and traps at the landing area.²⁸⁶ The States also ensure that third parties are involved in inspection processes, promoting compliance and accountability.²⁸⁷

Similar measures for the Antarctic area are not in place. Both science strategies focus on monitoring human impacts on the environment but neither biosecurity policy identifies systematic surveillance operations addressing NNS in the Antarctic environment or incorporating biosecurity into inspection processes.²⁸⁸ New Zealand and Australia have monitored for the presence of NNS in their inspections under the AT and PEPAT, but have not done so consistently.²⁸⁹ Other than the text of the Protocol

²⁷⁹ MAFBNZ, *Review of the Current State of the Biosecurity Surveillance System*, (2008); Australia, *Fourth National Report to the CBD* (2009), 79-81; R C A Thompson, *et al*, 'Parasites and biosecurity – the example of Australia' in (2004) 19(9) *Trends in Parasitology* 410, 414.

²⁸⁰ MAFBNZ, *ibid*.

²⁸¹ Macquarie Island Management Plan, 57, 65; HIMI Management Plan, 6.4.23, 6.5, 71; DOC, above n 144, 25.

²⁸² As well as the HIMI designation as a Ramsar wetland: HIMI Management Plan, 78-79.

²⁸³ See Chapter 3; UNESCO, *Operational Guidelines for the Implementation of the World Heritage Convention*, Annex II, WHC 81/01, January 2008; HIMI Management Plan, 78-79.

²⁸⁴ NZSAI Research Strategy, 13; DOC, above n 144, 25, 46 (Schedule 4 – Subantarctic Island Rodent Surveillance), 49 (Schedule 6 – Weed Control and Field Work Surveillance Forms).

²⁸⁵ Macquarie Island Management Plan, 125.

²⁸⁶ Heard Management Plan, 6.24, 6.23.

²⁸⁷ See Appendix X: Carried out in NZSAI and HIMI inspections, although not Macquarie.

²⁸⁸ New Zealand Science Strategy, 12; AAD Science Strategy, 6.

²⁸⁹ New Zealand has been involved in 5 inspections and Australia has been involved in 6: 'List of Inspections under Article VII of the Antarctic Treaty and Article 14 of the Protocol on Environmental Protection', <http://www.ats.aq/e/ats_governance_listinspections.htm>; For example: Australian Observer Team, *Scott Base and McMurdo Station: report of an Inspection under Article VII of the Antarctic Treaty and Article 14 of the Protocol on*

requiring “regular and effective monitoring of ongoing activities”²⁹⁰, the *Antarctic Environmental Protection Act 1994* (New Zealand) does not provide for additional monitoring responsibilities. The Australian provision requires additional monitoring for activities requiring an IEE²⁹¹ but otherwise does not identify a surveillance system.²⁹² ANZ’s biosecurity policy only provides “monitoring and control systems (e.g. traps) are maintained as required” implying surveillance systems are only triggered in responding to an invasive incident.²⁹³ The need for targeted, post-border environmental monitoring programs has been identified but not implemented by either of the AT Parties.²⁹⁴

However, both the AAD and ANZ put a strong emphasis on education and training of personnel to disseminate information on risks associated with NNS. Both issue a code of conduct that includes advice on decontaminating equipment, clothes and personal effects and invokes the limitations on intentional introductions in Annex II of PEPAT.²⁹⁵ Suppliers are also made aware of biosecurity standards by both programs.²⁹⁶ DOC has produced a similar *Minimum Impact Code* for the NZSAI, also urging visitors to take care between landings not to transport seeds and dirt.²⁹⁷ However, HIMI, Macquarie and NZSAI measures are all subject to the prioritisation of limited resources²⁹⁸ and the

Environmental Protection, (2005) 12 (See Appendix 3), 20; Foreign and Commonwealth Office (UK), AAD and *Instituto Antartico Peruano* (Peru), Antarctic Treaty Inspections 2005: Report of Antarctic Treaty Inspections undertaken jointly by the United Kingdom, Australia and Peru in accordance with Article VII of the Antarctic Treaty and Article 14 of the Protocol,’ 12, 52 (particularly noting the presence of untreated cedar logs and herbs and house plants growing at Bellingshausen, Russian Federation inspected on 16 February 2005); Sweden, France and New Zealand, ‘Amundsen-Scott South Pole (United States) and Concordia (Italy): Report of the Antarctic Treaty inspections undertaken jointly by Sweden, France and New Zealand in accordance with Article VII of the Antarctic Treaty and Article 14 of the Protocol on Environmental Protection to the Antarctic Treaty’, 16 [18.5], 23 [18.5]; for full details see *Appendix 3: Biosecurity Content of Inspection Reports Since PEPAT Came into Force*.

²⁹⁰ ANZ, above n 1, 1; PEPAT, Article 3(2)(d-e).

²⁹¹ Antarctic (Environmental Protection) Regulations (EIA) 1993 (Australia), Regulation 6 (m).

²⁹² C.f. Australia identified its conduct of hydroponics as a “potentially significant refuge for unintentional introductions” so introduced “monitoring for invertebrates using a range of trapping methods” to minimise the risk. Australia, *Australia’s Antarctic Quarantine Practices*, ATCM XXVII IP 71 (2004), 10.

²⁹³ ANZ, above n 1, [ii.f].

²⁹⁴ Potter, above n 14, 187.

²⁹⁵ AAD, *Antarctic Service Code of Personal Behaviour* (2008), <http://www.aad.gov.au/MediaLibrary/asset/MediaItems/ml_382104197916667_Code%20of%20Personal%20Behaviour%20151002.doc> at 29 September 2009; ANZ, *Environmental Code of Conduct* (2004), <<http://www.antarcticanz.govt.nz/downloads/environment/Codeconduct.pdf>> at 10 August 2009.

²⁹⁶ ANZ, above n 1, 10.

²⁹⁷ Southland Conservancy DOC, *Minimum Impact Code* (2008), <<http://www.doc.govt.nz/upload/documents/parks-and-recreation/places-to-visit/southland/subantarctic-islands.pdf>> at 11 September 2009.

²⁹⁸ HIMI Management Plan, 94; *National Parks and Reserves Management Act 2002* (Tasmania), Section 30(1).

self-regulation of managers, potentially resulting in operational interests being put ahead of environmental policy interests.²⁹⁹ In Tasmania and the NZSAI, the regular presence of third party observers may mitigate against the possibility of operators “taking short cuts,”³⁰⁰ but in HIMI Territory, the AAD is usually the only operator present at the time of activity.³⁰¹ The role of education and awareness measures is essential but should complement more comprehensive and independent monitoring and inspection processes.

The potential for gateway implementation of biosecurity control is reflected in the activities of both States. In addition to inspections of their own Antarctic programs, both Parties exercise the considerable discretion to enforce quarantine measures on air and sea vessels before entry to port.³⁰² The close interaction between AQIS and MAFBNZ, especially for the purpose of aircraft disinfection, is a model for other Gateway ports in identifying and targeting biosecurity risks in a strategic and cohesive pattern. To target pathways covered by sovereign immunity, Australia expressly requires visiting military to arrive free from quarantine risk material and provides for offshore and port inspections to ensure compliance³⁰³ and detailed procedures for limiting of biosecurity threats from aircrafts claiming sovereign immunity without physical inspection.³⁰⁴ A strategic approach to departure state control is not employed by either party but the domestic port state procedures offer some potential for the development of port state control for the Antarctic area.

4.2.3. SUMMARY OF NEW ZEALAND AND AUSTRALIAN IMPLEMENTATION OF BIOSECURITY ON NAPs IN ANTARCTICA AND THE SUB-ANTARCTIC

New Zealand and Australian engage in considerable scientific activity in the Antarctic and sub-Antarctic and in doing so expose the environment to a significant risk of NNS introduction. The

²⁹⁹ Potter, above n 67, 184; citing L K Kriwoken, P R Hay and P L Keage, ‘Environmental Policy Implementation: Sea Dumping off Sub-Antarctic Heard Island, Australia’, *Maritime Studies*, (1989) 48(1), 11-21.

³⁰⁰ Potter, above n 67, 184.

³⁰¹ Potter, above n 67, 185.

³⁰² Both Australia and New Zealand provide for extensive inspection, boarding, detention and enforcement action within the contiguous zone; *Biosecurity Act 1993* (NZ), Section 30-41; *Quarantine Act 1991* (Australia), Section 16-56; A Wilkinson and D Farr, *AQIS and MAFBNZ Schedule of Aircraft Disinsection Procedures*, Version 2.0 (October 2009).

³⁰³ AQIS, *Foreign Military Equipment and Personnel; Guidelines for Offshore Inspection* (2008).

³⁰⁴ AQIS, *AQIS Arrangements for Aircraft Invoking Sovereign Immunity* (2008).

presence of permanent bases in Antarctica and Macquarie Island, with the necessity of regular resupply, increases the risks of NNS introduction significantly and a comprehensive, strategic biosecurity framework is necessary to minimize risks. The nature of the inspection process and collective management promotes compliance and best practice, and both countries have acted consistently with their international obligations with a suite of practical mitigation measures aimed at reducing the risks of introducing NNS to the Antarctic environment through their scientific programs. Gaps still remain, in particular the developing rules surrounding biofouling and the lack of integration with other States processes. New Zealand's adoption of a risk-based approach to their biosecurity policy in Antarctica, in the context of a more international response, could prove invaluable. The domestic processes around NNS management also provide a vital buffer to the Antarctic environment, although are not designed to address the issue and do not effectively minimise risks in their current form. The primary biosecurity provisions of the sub-Antarctic are more comprehensive; however, the practical implementation of the system varies.³⁰⁵ Gaps also remain in the protection of the marine environment, particularly in the NZSAI where virtually no additional protection is afforded the territorial seas outside of the Auckland Island Marine Reserve. Collective management in the Antarctic has its issues but could result in a more effective biosecurity regime than provided in domestic regimes.

4.3. DOMESTIC REGULATION OF ANTARCTIC TOURISM

The large proportion of tourist vessels flagged to non-AT party states challenge the utility of AT Parties jurisdiction over their nationals in the Antarctic. The extent Australia and New Zealand can manage tourist activities in the Ross Dependency and AAT is limited by the jurisdictional compromise of the AT and thus relies on the compliance of the industry.³⁰⁶ In contrast, tourist activity is addressed in the sub-Antarctic with a significant level of precaution.

Although the activities associated with tourism present additional vectors for NNS introduction, tourism is not a pressing issue in the New Zealand and Australian claimed sectors of the AT area. Visits to the AAT and the Ross Dependency made up less than 3% of the total tourist numbers in the

³⁰⁵ Potter, above n 67, 184; DOC, above n 145, [12].

³⁰⁶ W M Bush, 'Australian Implementation of the Environmental Protocol' in D Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000), 331.

2008/9 season and unlike the Peninsula, numbers are unlikely to increase.³⁰⁷ In addition, only four Australian³⁰⁸ flagged tourist ships operated in the Antarctic and only two operators based outside of Australia and New Zealand visited continental sites in the 2008/09 season.³⁰⁹ However, the risks are still present; the Ross Dependency is the focus of tourist activity in the continental region with sites visited 3500 times in the 2008/9 season, compared with 513 to the AAT.³¹⁰ Eight tourist vessels will visit the New Zealand and Australian territory in the 2009-2010 season by sea.³¹¹ Moreover, the jurisdictional ambiguity means AT Parties only have limited control over the unique biosecurity threats posed by tourist activity.³¹²

Although tourism plays a significant role in the sub-Antarctic of both countries, the activity is treated with a more exacting application of the precautionary principle than scientific activity.³¹³ Most sub-Antarctic islands that allow tourism have dedicated sites that are carefully monitored with strict quarantine standards. Some tourist vessels visit the more accessible sub-Antarctic islands on the way to Antarctica; others focus only on the islands.³¹⁴ A significant number of tourists visit Macquarie Island³¹⁵ and NZSAI³¹⁶ annually but only 202 tourists on six vessels visited Heard Island from 1995 to

³⁰⁷ G R Cessford, 'Antarctic Tourism: A Frontier for Wilderness Management' (1997) 3(3) *International Journal of Wilderness* 7, 8.

³⁰⁸ No New Zealand flagged vessels operated in the 2008/09 season.

³⁰⁹ See Table 4.2; Australian and New Zealand operated vessels took 1188 visitors to the Antarctic in the 2008/9 season, 3% of the total tourist numbers; as the table indicates, although vessels are not flagged to Australia or New Zealand, almost 8 tourist operators are incorporated there.

³¹⁰ See Appendix 4: , Table 2.

³¹¹ Total approximated by IAATO, IAATO Overview of Antarctic Tourism: 2008-2009 Antarctic Season and Preliminary Estimates for 2009-2010 Antarctic Season ATCM XXXII IP 86 (rev 2) (2009), 3.

³¹² See Chapter 3, Section 3.2, Table 1.

³¹³ S V Scott, 'How Cautious is Precautious: Antarctic Tourism and the Precautionary Principle,' (2001) 50 *International and Comparative Law Quarterly* 967, 973.

³¹⁴ L Kriwoken and N Holmes, 'Snapshot Seven: Emerging Issues of Macquarie Island and Heard Island and McDonald Islands' in Australian Government's Cooperative Research Centres Program for Sustainable Tourism Pty Ltd, *Australian Antarctic and Sub Antarctic Tourism: Towards a Sustainable Industry* (2009), 15.

³¹⁵ A limit of 750 tourists per year is allowed, between 1990 and 2005, 334 visited annually: UNEP WCMC, *Macquarie Island Commonwealth of Australia* (2008), <<http://www.unep-wcmc.org/sites/wh/pdf/MacQuarie%20Island.pdf>> at 21 September 2009.

³¹⁶ A limit of 1000 visitors a year are allowed at certain large sites; DOC, above n 145, 9.

2004. As with science, any tourist activity in the areas must be approved by the relevant governmental agency.³¹⁷

TABLE 4.2: 2008/2009 IAATO TOURIST VESSELS FROM AUSTRALIA AND NEW ZEALAND AND OPERATIONAL IN CONTINENTAL REGION³¹⁸

Vessel	Vessel Registry	Operator State	Area visited	Capacity	Number of Voyages	Number of Passengers	Activities
Australis	Australia	Australia	All regions	9 (Yacht)	3	26	Zodiac, kayak, climbing
Bremen	Bahamas	Germany	All regions	164	4	130	Zodiac
Kapitan Khlbenikov	Russia	United States	All regions	108	3	68	Zodiac, helicopter
Marina Svetaeva	Russia	Australia	Continental/ Ross sea	108	2	204	Zodiac, helicopter
Orion	Bahamas	Australia	Continental/ Ross sea	106	3	288	Zodiac
Philos	Australia	Australia	All regions	5 (Yacht)	1	4	Zodiac
Polar Pioneer	Russia	Australia	Peninsula	56	10	511	Zodiac, kayak, camping, climbing, diving
Sarsen	Australia	Australia	Peninsula	15	1	8	Zodiac
Spirit of Enderby	Russia	New Zealand	Continental/ Ross sea	48	5	140	Zodiac, hovercraft
Spirit of Sydney	Australia	Australia	(All regions)	8 (Yacht)	1	7	Zodiac

4.3.1 PLANNING TOURISM TO PREVENT NNS

The methods employed to regulate tourist activities from New Zealand and Australia governs the capacity of the States to minimize biosecurity threats. The concept of a national reserve or park in domestic law is often closely affiliated with rights surrounding recreational use and tourism³¹⁹ and

³¹⁷ *National Parks and Reserves Management Act 2002* (Tasmania); Management Arrangements for activities in the Macquarie Island Commonwealth Marine Reserve, <<http://www.environment.gov.au/coasts/mpa/macquarie/activities.html>>; NZSAI CMS; NPRM Act 2002, Section 37.

³¹⁸ IAATO, above n 310.

³¹⁹ Under the NPRM Act 2002, the purpose of reserving a national park includes “providing for ecologically sustainable recreation” (Schedule 1(1)). Moreover, the *Conservation Act 1987* (NZ), states the management strategy of a National

both in the Antarctic and sub-Antarctic, Australia and New Zealand are committed to the legitimacy of tourism as an activity.³²⁰ However, both are also committed to ensuring that tourist activities are adequately regulated by the ATS,³²¹ avoiding any further expansion of the industry or the erection of any permanent infrastructure.³²² The New Zealand policy on tourism indicates a commitment to “the highest possible prevention of incident standards”³²³ and the Australian policy commits to “effective quarantine measures,”³²⁴ promoting a focus on biosecurity measures for tourism. All New Zealand and Australian operators are members of IAATO invoking the decontamination standards and reporting requirements of the industry organization. However, other than limiting the scope and supervising tourist activity, Australia and New Zealand do not apply additional quarantine measures to tourist vessels in the Antarctic, relying on the IAATO decontamination standards. In contrast, area-specific tools have been developed to manage tourism in the sub-Antarctic.

4.3.2.1 KEYS TO THE GATE: TOURIST EIA

Both Australia and New Zealand go beyond the requirements of the ATS to limit the scope of tourist activity and ensure biosecurity measures are taken. The AAD and MFAT require tourist and non-governmental expeditions to go through an environmental approval process consisting of Advance Notice, EIA, conditional approval and a Post-Visit Report Form.³²⁵ One EIA form for an operator is filled out each season, with details of all planned voyages and activities.³²⁶ Both MFAT and AAD advise consulting the COMNAP Guidelines. Although there is no provision in the legislation requiring consistency, conditions are often imposed to ensure the Guidelines are abided by.³²⁷ Templates of all

Reserve should “provide for their appreciation and recreational enjoyment by the public” (*Conservation Act 1987* (NZ), Section 2).

³²⁰ Bastmeijer, above n 276, 327 (NZ); P Goff, New Zealand Policy Statement on Tourism and Other Non-Governmental Activities in Antarctica MFAT (2009), <<http://www.beehive.govt.nz/node/16901>> at 23 November 2009; AAD, Australia’s Antarctic Tourism Policy (2004), <<http://www.aad.gov.au/default.asp?casid=20909>> at 23 November 2009.

³²¹ MFAT, *New Zealand Procedures for Antarctic Tourists and Other Non-Governmental Activities* (2009), <<http://www.mfat.govt.nz/Foreign-Relations/Antarctica/3-New-Zealand-Procedures-for-Visitors-to-Antarctica/index.php>> at 3 December 2009.

³²² AAD, above n 321; P Goff, above n 321.

³²³ P Goff, above n 321.

³²⁴ AAD, above n 321.

³²⁵ AAD, *Environmental approvals for tour and expedition* (2004), <<http://www.aad.gov.au/default.asp?casid=20918>> at 2 December 2009; MFAT, above n 322.

³²⁶ Ibid.

³²⁷ Gilbert, above n 90; Steinberger, above n 113.

of the documents are provided to operators, promoting specific mitigation measures to avoid NNS introduction. The AAD impact assessment questions do not specifically relate to non-native species introductions, although many of the provisions are impliedly relevant.³²⁸ Tourism applications are not “approved” unless they have addressed the issue of NNS within their application.³²⁹ Moreover, “most approvals include conditions related to non-native species introductions.”³³⁰ For example, an IEE approved by MFAT and the AAD in the 2008/09 season includes a separate document addressing environmental risks, including a section on the unintentional introduction of NNS.³³¹ The provisions effectively replicate the IAATO requirements for waste management, sewage disposal and shore landings, highlighting the tendency for NAPs to rely on IAATO to regulate environmental risks effectively.³³²

The environmental approval process for sub-Antarctic tourist operators are not substantially different from those required for scientific activities, but the scope of activity permitted is very restricted. Environmental approval is required to enter either States sub-Antarctic terrestrial areas. The Tasmanian Parks and Wildlife Service annually reviews its Guidelines for Tourist Operations and Visits to the Macquarie Island Nature Reserve (‘Macquarie Tourist Guidelines’), and thereby imposes an annual ceiling on tourist numbers permitted to land or come within the 3 nautical mile territorial sea of the island.³³³ The NZSAI CMS also limits tourist numbers in the NZSAI, with tourist landings prohibited in the “minimum impact islands” and limited to special areas in the refuge islands, although no additional express biosecurity procedures are introduced, as they are in the Macquarie Tourist Guidelines and HIMI Management Plan.³³⁴ The isolated and infrequent visitation of the HIMI

³²⁸ For example: AAD, *EIA Form* (Version 2, 2008); “4.4. What wastes will be generated and what are the impacts of handling them in this way? Please consider the following...ballast water.” See also, 4.5, 5 and Australian Test EIA 06/07, “3. In which activity will your activity take place...3.1 How will your activity impact on these environmental areas; 3.2 Describe the steps you propose to mitigate your impacts.”

³²⁹ Steinberger, above n 113.

³³⁰ Ibid.

³³¹ Email from James Walker, Antarctic Policy Unit, MFAT to Andrew Phillips, 28 April 2009; D McIntyre, M McIntyre and A Broadbent, *Initial Environmental Evaluation (IEE) – Australian Non-Government Operations in Antarctica “MV Orion”* (2008/09).

³³² E J Molenaar, ‘Sea-borne Tourism in Antarctica: Avenues for Further Intergovernmental Regulation’ (2005) 20 *International Journal for Marine and Coastal Law* 2, 31.

³³³ Tasmanian Parks and Wildlife Service, *Guidelines for Tourist Operations and Visits to Macquarie Island and Nature Reserve and World Heritage Area* (2009) (‘Macquarie Tourist Visitor Guidelines’); NPRM Act 2002 (Tasmania, Australia), Section 37.

³³⁴ NZSAI CMS, 42, table 4; HIMI Management Plan, 5.3, 49-54.

Territory has not made a restriction on numbers necessary. Precautions taken to prevent the introduction of pests are a condition on all entry permits, including abiding by strict decontamination standards, in the case of Tasmania, surpassing the requirements on scientists.³³⁵

Unlike the Antarctic, where the ATS does not create any mechanisms to allow AT Parties to prevent the erection of infrastructure, if a tourist operator wished to engage in infrastructure development in the Australian Sub-Antarctic, an EIA process would be required by the EPBC Act 1999.³³⁶ Any erection of buildings or actions for a commercial purpose must be carried out under a management plan within an Australian Commonwealth reserve and the HIMI management plan explicitly prohibits such an activity.³³⁷ Moreover, it is unlikely such a development would be permitted in the NZSAI with the requirement of the *Reserves Act (NZ) 1971* of “preserv[ing] [the reserve] as far as possible in its natural state.”³³⁸

The same marine pollution restrictions that apply to researchers and supply vessels apply to tourist vessels, without the restrictions on sovereign immunity, increasing the applicability of the IMO Pollution Conventions.³³⁹ However, there are limitations in the regulations, identified by New Zealand as a particular risk for tourist vessels is not addressed comprehensively.³⁴⁰ DOC’s lack of jurisdiction in the marine areas surrounding the NZSAI limits the capacity to target the issue.³⁴¹ Where a vessel makes a landing, it must have its hull-inspected and certified clean but tourist vessels may only engage in sea sightings of the islands.³⁴² In contrast, the HIMI and Macquarie Island Management plans limit access to marine areas surrounding the islands.³⁴³ The Macquarie Tourist Visit Guidelines, identical to the Management Plan, completely prohibits ballast discharge in the Reserve.³⁴⁴ In addition, the Guidelines require ships to provide a valid New Zealand Department of Conservation “Subantarctic Vessel Inspection Certificate” or equivalent, mitigating against bio-

³³⁵ See Appendix 6: Biosecurity Measures employed by Australia and New Zealand in Sub-Antarctic and Antarctic Areas.

³³⁶ EPBC Act 1994 (Australia), Section 354(f).

³³⁷ HIMI Management Plan, 52, 5.3.9.

³³⁸ Reserves Act 1977 (NZ), Section 20.

³³⁹ AAD, above n 321; MFAT, above n 322.

³⁴⁰ Dodgson, above n 218, 15-18.

³⁴¹ Ibid.

³⁴² Ibid; See 2.5 above.

³⁴³ See 2.4 above.

³⁴⁴ Macquarie Tourist Visitor Guidelines, 1.15.

fouling.³⁴⁵ This is not provided for in the Management Plan, highlighting the discrepancy between the way researchers operate and the ideal management conditions. A certification process is nevertheless an effective way to ensure tourist vessels visiting protected areas do not introduce NNS through bio fouling.

4.3.2. COMPLIANCE: EDUCATING, MONITORING AND SANCTIONING VISITORS

As Australia and New Zealand do not authorize all tourist activity that occurs in their Antarctic territories, ensuring tourist operators comply with legislation is a challenge. One of the tools used to ensure tourist compliance is restricting entry into ASPAs.³⁴⁶ The commercial viability of a tourist vessel often relies on entry to the primary attractions of the Antarctic area, huts and sites of high biodiversity, that are often protected through the ASPA process.³⁴⁷ Although the ASPA process does not apply to vessels registered to non-AT parties, IAATO invokes the ATCM Tourist Guidelines in urging its members to apply for a permit from an appropriate national authority.³⁴⁸ An requirement for membership in IAATO is “operating within the parameters of the Antarctic Treaty System.”³⁴⁹ Most tourist companies operating in the Ross Sea area apply for permits from Australia and New Zealand, in order to visit the ASPA areas in the Antarctic.³⁵⁰ In some areas of particular scientific interest or environmental vulnerability, no tourists will be approved access.³⁵¹ In contrast, in the sub-Antarctic, all tourist activity is restricted to areas put aside for tourism, allowing for better targeted monitoring activities and limiting cumulative impacts.³⁵²

Vessels that are approved by Australia and New Zealand are subject to the sanctions available under the domestic implementing legislation.³⁵³ In addition, both Australia and New Zealand implement

³⁴⁵ Ibid, 1.16.

³⁴⁶ Bastmeijer, above n 276, 412.

³⁴⁷ Ibid.

³⁴⁸ ATCM, Guidelines for those Organising and Conducting Tourism and Non-governmental Activities in the Antarctic ATCM XVIII Recommendation 1 (1994), reproduced at IAATO, Guidelines: Tour Operators <<http://www.iaato.org/guidelines.html>> at 3 July 2010.

³⁴⁹ *IAATO Bylaws*, Article II(D), Article III(B).

³⁵⁰ Gilbert, above n 90.

³⁵¹ For example: ATCM, Management Plan for ASPA No. 132: Potter Peninsula, King George Island (Isla 25 De Mayo), South Shetland Islands, ATCM XIII Measure 2 (1985), [7].

³⁵² NZSAI CMS, 42; Macquarie Island Management Plan, 86; HIMI Management Plan, 73, 6.4.22; 52, 5.3.10.

³⁵³ See above n 275.

awareness campaigns and supervision measures to target biosecurity threats. The educational component of awareness campaigns promotes vigilance as to the risk of NNS introduction. The AAD and MFAT refer operators to the ATCM Visitor Guidelines³⁵⁴ and ATCM Site Guidelines.³⁵⁵ In addition, New Zealand applies a significant condition for approval of tours wishing to land in the Ross Dependency; being accompanied by a national representative of the New Zealand government. A general inspector under the *Antarctic (Environmental Protection) Act 1994 (NZ)*³⁵⁶, the representative is responsible for, amongst other things, “any plant or animal quarantine regulations or procedures.”³⁵⁷ Australian policy is also to work within the ATS to institute a “coordinated inspection/ observer scheme to audit compliance with regulatory and voluntary measures governing tourist activities.”³⁵⁸ In practice, this involves direct observation once every few years, focussing on new operators and those who are not adequately complying with relevant obligations.³⁵⁹ This is also the policy in regards to visits to the HIMI Territory,³⁶⁰ although it is rarely implemented.³⁶¹ Moreover, both Australia and New Zealand implement the ATCM Post Visit Reporting system, although do not include any additional requirement to comment on NNS presence or absence.³⁶² The enforcement of these provisions could prove problematic if activity increases in the area. However, given the small size of the industry, this appears to be an effective method of ensuring compliance.

The potential for tourist vessels to act as hubs of monitoring activity is not realised in either Australia or New Zealand, although the HIMI management plan “invites” all visitors to report to the AAD any sightings of alien NNS and tourist operators have responsibilities to monitor for and respond to NNS incidents.³⁶³ As in research expeditions and the Antarctic, any tourist landing in the NZSAI must be accompanied by a DOC representative who will ensure quarantine management steps are taken.³⁶⁴ In the HIMI Territory, “the Director may seek to recover any costs associated with management

³⁵⁴ Ibid.

³⁵⁵ Ibid.

³⁵⁶ Antarctic (Environmental Protection) Act (NZ) 1994, Sections 39-41.

³⁵⁷ MFAT, above n 322, Appendix 6.

³⁵⁸ AAD, above n 326.

³⁵⁹ AAD, above n 321.

³⁶⁰ HIMI Management Plan, 52, 5.3.4.

³⁶¹ Potter, above n 67, 187-188.

³⁶² AAD, above n 321; MFAT, above n 322.

³⁶³ HIMI Management Plan, 53, 5.3.16.

³⁶⁴ NZSAI CMS, 5.3.1.

action taken to mitigate or address NNS introduction to the Reserve, from those responsible for the introduction,”³⁶⁵ creating an additional reason to monitor activities carefully. One of the obligations on the AAD in Macquarie Island is the monitoring of tourist landing areas for the presence of new NNS.³⁶⁶

4.3.3. SUMMARY OF DOMESTIC REGULATION OF ANTARCTIC TOURISM

Antarctic tourism is regulated sparsely by the New Zealand and Australian authorities, perhaps due to the proportionately low numbers visiting continental sites and the perceived effectiveness of IAATO. The precautionary mitigation measures in place applicable to scientific and tourist operators do a great deal to reduce the risk but the lack of any form of required response measures or contingency plans is a dangerous gap in the system. The presence of a National Representative on vessels landing in the Ross Dependency and NZSAI allows for rigid enforcement of the quarantine measures in place and identification of issues that may arise. However, the capacity of the States to limit the spatial extent and quantity of tourism in the Sub-Antarctic demonstrates the significant benefits to sovereignty when addressing private industry. There are gaps, especially in the marine environment of the NZSAI, which is in the process of being adequately protected, but the proactive approach to the management of tourism is a model for the development of Antarctic regulation.

4.4. DOMESTIC REGULATION OF ANTARCTIC FISHERIES

The scope of Australian and New Zealand fisheries activity further exposes the Antarctic environment to the risk of NNS introduction. However, the lack of consideration given to biosecurity in relation to fishing vessels at the international and regional level is to some extent mitigated by domestic practice. Although a strategic approach to exclude introductions of NNS through fisheries activity is not adopted,³⁶⁷ as with tourism, limiting the scope of the activity limits the potential for

³⁶⁵ HIMI Management Plan, 6.4.33, 75.

³⁶⁶ Macquarie Island Management Plan, 83.

³⁶⁷ MFish, *Strategy for Managing the Environmental Effects of Fishing*, (2005), <<http://www.fish.govt.nz/NR/rdonlyres/B341907D-D284-4E3D-BC19-9628D3301902/1505/SMEEF Papa2.pdf>> at 5 December 2009 (“This Strategy does not directly address biosecurity....These matters are addressed by... [MAF]”); AFMA, *Summary of management, environmental, and research measures in place for Australian operators in sub-Antarctic waters*,’ (2009),

introduction and both States effectively manage their own fishing vessels activity.³⁶⁸ Both Australia and New Zealand are members of CCAMLR and of their flagged vessels engaged in marine living resource harvesting in the Southern Ocean.³⁶⁹ none have been listed on CCAMLR's black list. However, the ecosystem approach promoted by CCAMLR and requirement to consider potential impacts of NNS has never been implemented systematically.³⁷⁰ Commercial fisheries also operate in the EEZ around the NZSAI, Macquarie Island and the HIMI territory. Significantly, within those areas Australia and New Zealand have the power to enforce their fisheries regimes, in contrast to the limited enforcement capacity in the Antarctic. New Zealand and Australia's domestic management of the fisheries industry has been rated amongst the most comprehensive in the world.³⁷¹ However, the latest analysis concluded, "the highest ranking country [New Zealand] does not approach the high standards set either by international convention or consensus amongst scientists and managers,"³⁷² which is evident in the absence of biosecurity.

4.4.1 LIMITING A PATHWAY OF INTRODUCTION: MANAGING FISHERIES IN THE ANTARCTIC AND SUB-ANTARCTIC

The main statutory limit on fisheries activity in the Antarctic and sub-Antarctic is the requirement for a permit.³⁷³ Both Australia and New Zealand reserve the right to impose conditions on those permits.³⁷⁴ It is an offence to fish in the Antarctic without one and it is an offence to act contrary to a

<http://www.afma.gov.au/fisheries/antarctic/publications/Summary_measures_20090430.pdf> at 6 December 2009 (no mention of any biosecurity measures).

³⁶⁸ See for example: MAFBNZ, 'Importing Antarctic Fish', issued pursuant to Section 22 Biosecurity Act 1993 (2007).

³⁶⁹ The fishing vessels have remained stable over the last 4 years: in the period 2009 to 2006, Australia had 3 vessels, apart from the 2006-7 season where they had 2, New Zealand had 4 vessels, apart from the 2007-8 season where they had 5; CCAMLR, *Details of Fishing Licences/Permits* (2010), <<http://www.ccamlr.org/pu/e/sc/fish-monit/vess-licensed.htm>> at 1 July 2010.

³⁷⁰ See *Chapter 2, Section 2.4.1*.

³⁷¹ T Pitcher, *et al*, 'Safe conduct? Twelve years fishing under the UN code' WWF report (2008); T Pitcher, *et al*, 'An evaluation of progress in implementing ecosystem-based management of fisheries in 33 countries' (2009), 33(2) *Marine Policy* 223; C Mora, *et al*, 'Management effectiveness of the world's marine fisheries', (2009) *PLoS Biology* 7; J Alder, *et al*, 'Aggregate performance in managing marine ecosystems of 53 maritime countries' (2009) 34(3) *Marine Policy* 468.

³⁷² Alder, *ibid*, 774.

³⁷³ Including recreational; *Antarctic Marine Living Resources Conservation Act 1981* (Australia), Section 8; *Antarctic Marine Living Resources Act 1981* (NZ), Section 5(1).

³⁷⁴ *Antarctic Marine Living Resources Act 1981* (NZ), Section 5(3)-(4); *Antarctic Marine Living Resources Conservation Act 1981* (Australia), Section 5(3)-(4); Section 9(4)-(5).

condition in the permit.³⁷⁵ In certain areas however, one cannot gain a permit to fish commercially. Some analysis of activity is required before commencement. To engage in a “new activity” in the fisheries industry, one must trigger CCAMLR’s new and exploratory fishery regime.³⁷⁶ In March 2009, Australia published a *Guide to CCAMLR New and Exploratory Fisheries* giving operators a framework on how to apply for access to CCAMLR’s new and exploratory fisheries.³⁷⁷ These include the environmental standards that the ship must meet before Australia will submit their entry to the Commission.³⁷⁸ The *AFMA Vessel suitability assessment guidelines* focus on the safety of the vessel, rather than its environmental suitability.³⁷⁹ Fisheries vessels are not subject to the EIA process. Although New Zealand did for some time,³⁸⁰ it no longer requires its fisheries vessels to engage in an EIA.³⁸¹

Although both acknowledge the importance of spatial management of fisheries and protecting areas for stock recovery, there is significant difference between Australia and New Zealand’s standard of MPAs in their domestic fisheries. Australia invests almost 10% of the landed value of fisheries into MPAs and New Zealand contributes less than 1%.³⁸² While Australia protects its marine areas surrounding its sub-Antarctic, New Zealand only protects a small percentage of its marine area. The legal underpinning of fishing in New Zealand waters is similar to that in Antarctic waters. The purpose of the *Fisheries Act 1996* is “to provide for the utilisation of fisheries resources while ensuring sustainability.”³⁸³ New Zealand permits trawling and long-line fishing around the sub-Antarctic islands, although most is conducted outside the 12 nautical mile limit of the Territorial Sea. No trawling by vessels greater than 46m can take place inside the New Zealand nautical mile

³⁷⁵ Antarctic Marine Living Resources Act 1981 (NZ), Section 4; Antarctic Marine Living Resources Conservation Act 1981 (Australia), Section 7.

³⁷⁶ New (CM 21-01(2008)); Exploratory (21-02 (2006)).

³⁷⁷ AFMA, *Guide to CCAMLR New and Exploratory Fisheries* (2009), <http://www.afma.gov.au/fisheries/antarctic/ccamlr/publications/cclamr_guide_2009.pdf> at 3 October 2009.

³⁷⁸ AFMA, *ibid*, 5.

³⁷⁹ AFMA, *ibid*, Appendix B.

³⁸⁰ A D Hemmings, K N Scott and M Rogan-Finnemore, ‘Broadening the duty in relation to Environmental Impact Assessment across the legal instruments applying in Antarctica’ (Paper presented at 15th Annual Conference of the Australian and New Zealand Society of International Law 'Restoring the Rule of Law in International Affairs', Canberra, Australia, 28-30 Jun 2007), 18.

³⁸¹ Email from James Walker, Antarctic Policy Unit, MFAT to Andrew Phillips, 28 April 2009.

³⁸² Alder, above n 372, 1, 6.

³⁸³ *Fisheries Act 1996* (New Zealand), Section 2.

Territorial Sea, although this does not exclude commercial fisheries under that size.³⁸⁴ The Auckland/Mohu Maha Islands are designated a Marine Reserve with all commercial and recreational fishing banned in the 498,000 ha surrounding area.³⁸⁵ However, New Zealand's commitment to marine protection is outlined in the Marine Protected Areas Policy and Implementation Plan and includes more comprehensive protection of the Marine Sub-Antarctic environment.³⁸⁶

Australian Commonwealth fisheries are managed by the Australian Fisheries Management Authority ('AFMA'), under the provisions of the *Fisheries Management Act 1991* (Australia). Offshore Constitutional Settlement Fisheries Arrangements exist between each state/Northern Territory and the Commonwealth government applies state law within 3 nautical miles of the coast, and Commonwealth rules from 3 to 200 nautical miles, which permits Tasmania to designate a no-take zone within 3 miles of Macquarie Island's coast under *National Parks and Reserves Management Act 2002* (Tasmania).³⁸⁷ Fisheries around Macquarie Island are very limited.³⁸⁸ Commercial trawl fishing takes place between 3 and 200 nautical miles outside the Macquarie Island Marine Park and a demersal longline trial is currently active in the Macquarie Ridge sector.³⁸⁹ In 2005 a strategic assessment under the EPBC Act 1999 established that the fishery operates under an adaptable and precautionary regime capable of controlling, monitoring and enforcing the level of take from the fishery.³⁹⁰ Consistent with their designation as IUCN strict nature reserves,³⁹¹ commercial and recreational fishing is prohibited in the HIMI Territorial Sea, inner marine zone.³⁹² However, outside a 1 nautical mile buffer of the Territorial Sea, Australian commercial fishing targets Mackerel Icefish

³⁸⁴ There is also potential for development of smaller vessel type spider crab stock closer to shore: DOC and MFish, *Marine Protection of New Zealand Subantarctic Islands* (2006), <<http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/marine-protected-areas/marine-protection-nz-subantarctic-islands-1.pdf>> at 10 October 2009, 37.

³⁸⁵ *Marine Reserves Act 1971* (NZ), Section 3(3); M de Villiers, *et al*, 'Conservation Management at Southern Ocean Islands: towards the Development of Best-Practice Guidelines,' (2005) *Polarforschung* 75 (2-3), 116.

³⁸⁶ DOC and MFish, *Marine Protected Areas Policy and Implementation Plan* (2006), <<http://www.biodiversity.govt.nz/pdfs/seas/MPA-Policy-and-Implementation-Plan.pdf>> at 30 September 2009, 39.

³⁸⁷ *NPRM ACT 2002*, Section 37.

³⁸⁸ Macquarie Island Management Plan, 8.

³⁸⁹ AFMA, *Macquarie Island Fisheries: At a Glance* (2009), <http://www.afma.gov.au/fisheries/antarctic/macquarie/at_a_glance.htm> at 1 October 2009.

³⁹⁰ T Hurdle, *Macquarie Island Fishery* (2005), <<http://www.environment.gov.au/coasts/fisheries/commonwealth/macquarie-toothfish/decision-rundle.html>> at 30 September 2009.

³⁹¹ See above, *Chapter 3, 3.2.1.2*.

³⁹² HIMI Management Plan, 130; *EPBC Act Regulations 2000*, 12.35.

and Patagonian toothfish.³⁹³ The fishery falls within the ambit of the adjoining CCAMLR statistical division 58.5.2. Both HIMI and Macquarie marine areas, designated reserves under the EPBC Act 1999, are no-take zones.³⁹⁴

4.4.2. CASTING A NET FOR NNS: PREVENTING INTRODUCTION FROM FISHERIES

Neither New Zealand nor Australia's CCAMLR ratifying legislation address the issue of NNS, except through the ratification of CCAMLR, Article 3(c).³⁹⁵ Both implement the relevant conservation measures of CCAMLR,³⁹⁶ which decreases the risk of NNS introduction to some extent. AFMA has enacted regulations for the fisheries in the HIMI Territory³⁹⁷ and Macquarie Territory, but neither contains any additional requirements relevant to NNS.³⁹⁸ However, significantly, New Zealand permits issued for the collection of Antarctic marine living resources include a condition that requires a hull clear of any fouling organisms prior to departure for the CCAMLR area.³⁹⁹ However, the Australian approach relies on non-binding guidelines under the national response to marine pests. Australia's Biofouling Guidelines for Commercial Fisheries Vessels, promoting safe cleaning and antifouling application, advises steaming of nets close to the fishing ground specific to fishery operations and locally sourced bait wherever possible to prevent introduction of NNS.⁴⁰⁰ Where marine pests are identified, the Guidelines urge the reporting of interactions with marine pests and freezing of samples. It lists indicators as "unusually heavy biofouling, dominance of the fouling by

³⁹³ HIMI Management Plan, 130.

³⁹⁴ HIMI Management Plan, 130; DEWHA, Interim Management Arrangements for Macquarie Island Commonwealth Marine Reserve issued under Section 359(b) of the EPBC Act 1999 (2008), <<http://www.environment.gov.au/coasts/mpa/southeast/macquarie/management.html>> at 28 October 2009.

³⁹⁵ CCAMLR meeting XXVII (2008), 13.66-7.

³⁹⁶ *Antarctic Marine Living Resources Conservation Regulations* 1994 (Australia); *Fisheries (High Sea Fishing Notifications – Commission for the Conservation of Antarctic Marine Living Resources) Notice* 2009 (NZ).

³⁹⁷ Fisheries Management (Macquarie Island Toothfish Fishery) Regulations 2006, Selective Legislative Instrument 2006 No. 255.

³⁹⁸ With the exception of Heard Island's Requirements for Observers and Inspection requirements discussed in "Inspection and Monitoring"; *Fisheries Management (Heard Island and McDonalds Fishery) Regulations* 2000 (Australia) Statutory Rules 2002 No. 115 as amended, Section 11-17, 30-32.

³⁹⁹ Email from Ben Sims, International Adviser, MFish (NZ), 16 April 2010.

⁴⁰⁰ Australia, *National Biofouling Management Guidelines for Commercial Fishing Vessels* (2009), <http://www.marinepests.gov.au/__data/assets/pdf_file/0010/1109593/Biofouling_guidelines_fishing.pdf> at 10 July 2009, 8.

one species or a new ‘species’ not seen before in your region.”⁴⁰¹ If an emergency pest outbreak occurs, additional reporting to specific ports or areas might be required or if caused by negligence of the operator, might give rise to liability.⁴⁰²

Some evidence suggests the CM 26-01 is implemented consistently. New Zealand’s model EIA that was provided for fisheries vessels addresses waste consistently with the CM; biodegradable food wastes macerated and sewage discharged as far away and at least 12 nautical miles from land.⁴⁰³ Similarly, the Australian New and Exploratory Fisheries guidelines provide for “a prohibition on the discharge of poultry products and brassicas to ensure diseases and pests are not introduced to the Antarctic environment”.⁴⁰⁴ However, there is no evidence of effective ballast water management on fishing vessels or conditions on fishing equipment or bait.

4.4.3. OBSERVING AND INSPECTING FISHERIES: IMPLEMENTING COMPLIANCE

The compliance measures in CCAMLR are reinforced by both New Zealand and Australia requiring joint international and government representatives on board fishing vessels and engaging in fisheries enforcement patrols in the Southern Ocean.⁴⁰⁵ Inspectors under both jurisdictions are given significant powers to board vessels suspected of contravening rules under the Acts and arrest without warrant, as well as a significant number of other useful compliance measures.⁴⁰⁶ Although the biosecurity measures are not a focus of inspectors, they provide the opportunity for identification of NNS issues and promoting compliance with the relevant provisions. In addition, the biofouling guidelines promoted by both New Zealand and Australia encourage compliance through education. However, no specific measures are employed in relation to Antarctic activity.⁴⁰⁷ Enforcement and surveillance in relation to domestic fisheries is more comprehensive. In the HIMI

⁴⁰¹ Ibid, 10.

⁴⁰² Ibid; AQIS, *Australian Ballast Water Requirements* (Version 4, 2008), 10.

⁴⁰³ New Zealand Longline, *Antarctic Chieftan*, IEE – 2008/2009, (2009), 22-23.

⁴⁰⁴ AFMA and DEWHA, *Guide to CCAMLR New and Exploratory Fisheries* (2010) 5.

⁴⁰⁵ Email from Ben Sims, International Adviser, MFish (NZ), 16 April 2010; Potter, above n 67, 189.

⁴⁰⁶ *Antarctic Marine Living Resources Conservation Act 1981 (Australia)*, Section 13-17; in 2001, an amendment to the *New Zealand Antarctic Marine Living Resources Act 1981* merged the Antarctic inspector regime with the high sea inspection regime under the *Fisheries Act 1994*: Section 13Q-W.

⁴⁰⁷ See above, Section 4.2.1.5.

EEZ, IUU fishing has not been observed in the Reserve.⁴⁰⁸ Surveillance patrols are carried out by civilian and Australian Defence Force vessels, with the intention of enforcing fisheries legislation and deterring IUU fishing in the Reserve and CCAMLR area. Australia and France cooperate in their surveillance of the adjacent EEZs surrounding HIMI and Illes Kergulen.⁴⁰⁹ Regular surveillance and monitoring is also prescribed for the NZSAI and Macquarie Island Marine Park.⁴¹⁰

4.4.4. SUMMARY OF DOMESTIC IMPLEMENTATION OF FISHING

Fishing activity poses the most significant challenge to any regime attempting to protect biodiversity. An established industry with significant interests and investment vested in the CCAMLR and sub-Antarctic fisheries will always resist additional costs and the presence of large scale illicit fisheries means enforcing biosecurity measures on legal operators may be fruitless.⁴¹¹ The Australian and New Zealand protection of domestic fisheries demonstrates the effectiveness of sovereign control over marine areas; especially Australia addressing fisheries' specific biosecurity issues. Australia and New Zealand have useful methods to support implementation and ensure compliance with ATS norms that effectively limit the environmental impacts of fishing activities in the Antarctic. However, issues identified in the best-practice Australian guidelines including: non-local bait, bio-fouling of the hull and refuge areas, are not addressed consistently in relation to the Antarctic. Both employ educational measures to prevent biofouling in domestic territory, including the sub-Antarctic. New Zealand's adoption of hull fouling standards for its Antarctic fishing operations are an important first step towards a systematic management of biosecurity threats associated with fisheries activity. To implement Article 3(c) of CCAMLR adequately, the domestic buffer provided by ports must be effectively utilised to limit biosecurity threats to the Antarctic marine environment from fishing.

⁴⁰⁸ HIMI Management Plan, 131.

⁴⁰⁹ Treaty between the Government of Australia and the Government of the French Republic on Cooperation in the Maritime Areas Adjacent to the French Southern and Antarctic Territories, Heard Island and the McDonald Islands signed on 24 November 2003. 2438 United Nations Treaty Series (entered into force 1 February 2005).

⁴¹⁰ DEWHA, *Research and Monitoring Plan for the Macquarie Island Marine Park* (Under Review, 2001); NZSAI Research Strategy.

⁴¹¹ See for example: New Zealand Longline, above n 405, 28; "Any decision to prevent access to this fishery this season would have a substantial financial implication for both Sealord Group and Amatal Fishing....We have entered into significant financial commitments based on the research we have undertaken in this fishery."

4.5. AUSTRALIAN AND NEW ZEALAND IMPLEMENTATION OF THE ANTARCTIC BIOSECURITY FRAMEWORK: A SUMMARY

Australia and New Zealand have both developed a sophisticated biosecurity framework to provide for controls on the unintentional introduction of NNS into their own environments that have limited applicability to their Antarctic operations. Both have policy which effectively reduces risks from Antarctic operations but it is without the strategic basis necessary for comprehensive protection, in line with best practice under the CBD. In the scientific, terrestrial Antarctic context, New Zealand and Australian provisions provide a useful model for other AT Parties and their domestic biosecurity provisions provide a limited buffer to marine pests making the voyage south. The main issue, in comparison to the sub-Antarctic, is the presence of other operators in similar areas complicating preventative, monitoring and response application.

Moreover, the gaps that remain are symptomatic of the issues faced in the ATS. Tourist and fisheries activities are effectively governed by the same biosecurity measures as those designed for scientific programs, and often the specific problems relevant to fisheries and tourist activities have no risk assessment or mitigation. The marine environment has minimal additional protection in the domestic regime, with both States ballast water practices developing to comply with the Ballast Water Convention, although still currently relying on the problematic open water exchange. In addition, the certification process to avoid biofouling in the NZSAI and Macquarie Island has some applicability to tourist ships visiting the sites, but otherwise there is very little to protect the Antarctic marine environment from invasive marine NNS. In addition, even in the sub-Antarctic where jurisdiction is confirmed, practical enforcement is limited by the remoteness of sub-Antarctic environments. Political factors in the Australian sub-Antarctic surrounding the confusing jurisdictional nexus of players and geographical issues with enforcement are a serious barrier to effective control.⁴¹² In the collective governance of the ATS, political factors benefit the management, with diplomacy and reputation having a role in encouraging State parties to comply with obligations under the ATS. However, the lack of a central inspectorate body means the primary

⁴¹² See Potter, above n 67.

method of ascertaining compliance is limited to AT Party-initiated inspections, which are not always effective.

A BIOSECURITY FRAMEWORK FOR THE ANTARCTIC AREA

“...the Antarctic provides one of the last opportunities available to humankind to demonstrate our ability to instigate and apply continent-wide control and conservation measures...failure to do so will provide an irreversible legacy.”¹

“The establishment of [biosecurity] commitments in legally binding form would be an important manifestation of the commitment of the Treaty Parties to being proactive on the [NNS] issue, to setting standards for themselves of an appropriately precautionary kind and to taking collective steps to secure compliance by the wider international community.”²

5.1. INTRODUCTION

The final chapter of the thesis provides a summary of the gaps and priorities in biosecurity in the Antarctic area and critically analyses the options the ATS has to address the risks posed by the introduction of NNS. The first section summarizes the gaps identified in the preceding chapters, with a focus on the risk areas that are not adequately addressed. The second section identifies the components of an ideal framework for biosecurity in the Antarctic, evaluating both the objectives and institutions forming the foundation of the framework and the substantive components and compliance mechanisms for implementing the objectives. The final section discusses the most appropriate steps to implement the system, analysing the extent regional and international approaches can be synthesized to better protect the Antarctic region.

¹ P Convey, ‘Non-native species in Antarctic terrestrial and freshwater environments: presence, sources, impacts and predictions’ in M Rogan-Finnemore (ed.), *Non-Native Species in the Antarctic Proceedings* (2008), 117.

² B Mansfield and N Gilbert, ‘Availability and Applicability of Legal Tools for Managing Non-native Species,’ in M Rogan-Finnemore (ed.), *Non-Native Species in the Antarctic Proceedings* (2008), 157.

5.2. THE CURRENT FRAMEWORK: GAPS AND PRIORITIES

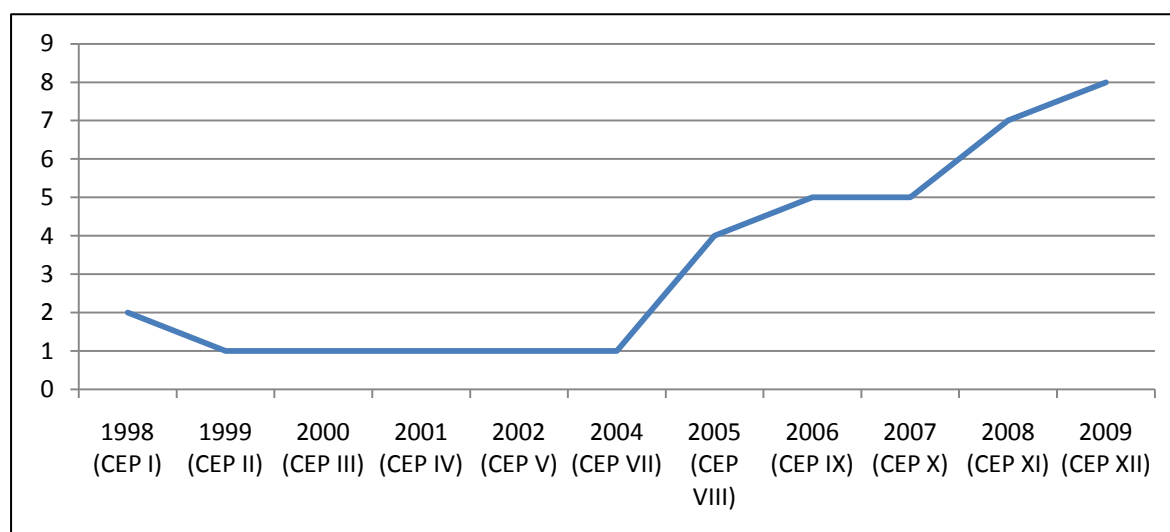


FIGURE 5.1: IP, WP AND SP RELEVANT TO THE ISSUE OF NNS SUBMITTED TO THE CEP

The legal and institutional fragmentation characteristic of domestic biosecurity frameworks is compounded in a region where individual States are responsible for implementing their own interpretation of collective rules. Although the ATS needs a strategic approach, comprehensive planning processes and effective compliance mechanisms to mitigate the inevitable inconsistent approaches, PEPAT only expressly regulates intentional introductions. The prioritisation of biosecurity in the context of Article 3 of PEPAT through the CEP sets the foundation for a strategic approach. Mansfield and Gilbert noted “an early phase in the process [of addressing biosecurity] should include promotion of awareness of the issue and encouragement of the sharing of best practise.”³ The growing number of papers submitted by AT Parties,⁴ SCAR’s Environmental Code of Conduct and the ICG on Biosecurity indicate an increasing consideration of biosecurity in AT Parties practice. Moreover, although addressed primarily by Australia, New Zealand and NGOs until 2007, in 2008 and 2009, 11 different states submitted relevant IPs and WPs.⁵ However, while an ambitious work program addresses the issue and a number of states and organisations offer specific advice for aspects of Antarctic activity, it is a reflection on the limitations of the ATS that after almost 12 years of consideration, no formal recommendation offers any guidance on holistically implementing biosecurity on Antarctic activities. Based on an overview of international instruments and national

³ Ibid, 155.

⁴ See Figure 5.1 below.

⁵ See *Appendix 1: Summary of Submissions to CEP on NNS*.

best practice, the IUCN provides a checklist for States in the process of implementing a national framework.⁶ The table below demonstrates that, although the ATS has enacted considerable biosecurity coverage in the Antarctic area, it does not approximate the comprehensive coverage necessary to minimise NNS risks.

TABLE 5.1: SUMMARY OF REGIONAL LEGAL MEASURES PROVIDING FOR BIOSECURITY IN THE ANTARCTIC⁷

Key Component(s)	Program Element	Legal Measures ⁸
International standards	Implement and enforce international standards in quarantine measures and transport controls;	Practical Guidelines on Ballast Water management in the Antarctic adopted by the IMO.
Border Control	Apply preventative and precautionary measures, using risk analysis, permits or other appropriate tools, to control introductions into and within [Antarctica];	PEPAT, Annex II, Article 4: prohibiting intentional introductions without a strictly limited permit (with the exception of food) and requiring precautions to prevent the unintentional introductions of micro-organisms. Sterile soil and live poultry is prohibited. [Tourists] IAATO Decontamination Guidelines. [Scientists] SCAR Environmental Code of Conduct
Protected areas	Prohibit, or strictly regulate the use and release of alien species in or near closed or vulnerable ecosystems and protected areas;	Consideration of biosecurity in ASPA Management Plans, ASMA Codes of Conduct and Site Guidelines. ⁹
Surveillance	Provide for monitoring [to inform short-term response]	PEPAT, Article 3(2)(e): “regular and effective monitoring...to facilitate possible unforeseen effects of activities carried out within and outside the AT area.”
Short-Term Response	Implement early warning and emergency planning systems to supply rapid responses where biological invasions are detected;	PEPAT, Article 15, Annex VI PEPAT: Contingency plans, response and liability for default in so far as NNS are defined as an “environmental emergency”. PEPAT, Annex II, Article 4(5): requiring NNS introduced without permits to be removed, unless that removal would result in a greater adverse environmental impact. [Tourists]
Long-Term Response	Require timely measures for eradication or control of species that are already invasive or become invasive in the future, subject as necessary to prior assessment of techniques to be used;	-
Compliance	Strengthen compliance by public, commercial and private actors;	AT, Article X; PEPAT, Article 13: Generic Compliance Measures; PEPAT, Article VII, PEPAT Article 15: Inspection Regime PEPAT, Article 17: Reporting Process
Research and public awareness	Support research, training, education and public awareness.	Aliens in Antarctica International Polar Year Project. Alien Species in Antarctic Biodiversity Database. [Tourists] “Guidelines for Visitors to the Antarctic” Recommendation 1/ATCM XVIII (2005). [Scientists] SCAR Environmental Code of Conduct.

⁶ C Shine, N Williams and G Gündling, *A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species* (IUCN Environmental Policy and Law Paper No. 20, 2000), 40-41.

⁷ Key Components and Elements based on Shine, *ibid*, ‘4.3.3. Primary Goals and Components of Legislation’ 40-41.

⁸ Informal guidance offered through CEP Information Papers is discussed at Chapter 2, Section 2.1.1.2 and in Appendix 1.

⁹ See above Chapter 3, Section 2.2.1.3; United Kingdom, Review of provisions related to NNS introductions in ASPA and ASMA management plans ATCM XXXII WP 33 (2009).

As a strategic regional approach to biosecurity is necessary to minimise the risk of NNS introduction, there is little in global biodiversity law which directly complements the ATS. The CBD offers a qualified framework of tools that have some utility in the Antarctic area. Implementing some of the provisions in relation to Antarctic activities, in particular the generic requirement to take biosecurity measures as well as strategic assessment and reporting processes, would benefit a strategic approach to biosecurity in the Antarctic. However, the CBD does not effectively address areas beyond national jurisdiction and is not well implemented by AT Parties. The potential of the CBD is in building stronger relationships with other legal regimes and building legitimacy in the international community.

Correspondingly in the marine environment, the consideration of NNS is required by UNCLOS but without elaboration, the obligation has little practical impact. In relation to identified high-risk aspects of marine activity, the comprehensive Ballast Water Convention has yet to come into force and there is no express obligation or mechanism to prevent ships with fouled hulls and surfaces introducing NNS to new environments. A significant proportion of ships operating in the Antarctic marine area are either flagged to States not party to the ATS or covered by the sovereign immunity provisions in the ATS, BWM Convention and UNCLOS. This implies the ATS is limited in its capacity to mitigate a significant proportion of biosecurity risk for the marine environment. Despite the limitations, the ATME on Ship-Borne Tourism recommends enhancing the relationship between the IMO and ATS and with the development of biofouling guidelines through the former, further collaboration for the purposes of biosecurity is foreseeable.¹⁰ However, the IUCN and CBD identify the marine environment as a significant gap in the international regulation of biosecurity.¹¹

¹⁰ *Chairs' Report of Antarctic Treaty Meeting of Experts on Ship Borne Tourism in the Antarctic Treaty Area* (2009).

¹¹ CBD Executive Secretary, *Indepth Review of Invasive Alien Species* UNEP/CBD/COP/9/INF/32 (2008), 51; I Meliane and C Hewitt, *Gaps and Priorities in addressing Marine Invasive Species* (2005), IUCN information document <http://i3n.iabin.net/documents/pdf/MarineAIS_GAPS-PRIORITIES.pdf> at 30 April 2010.

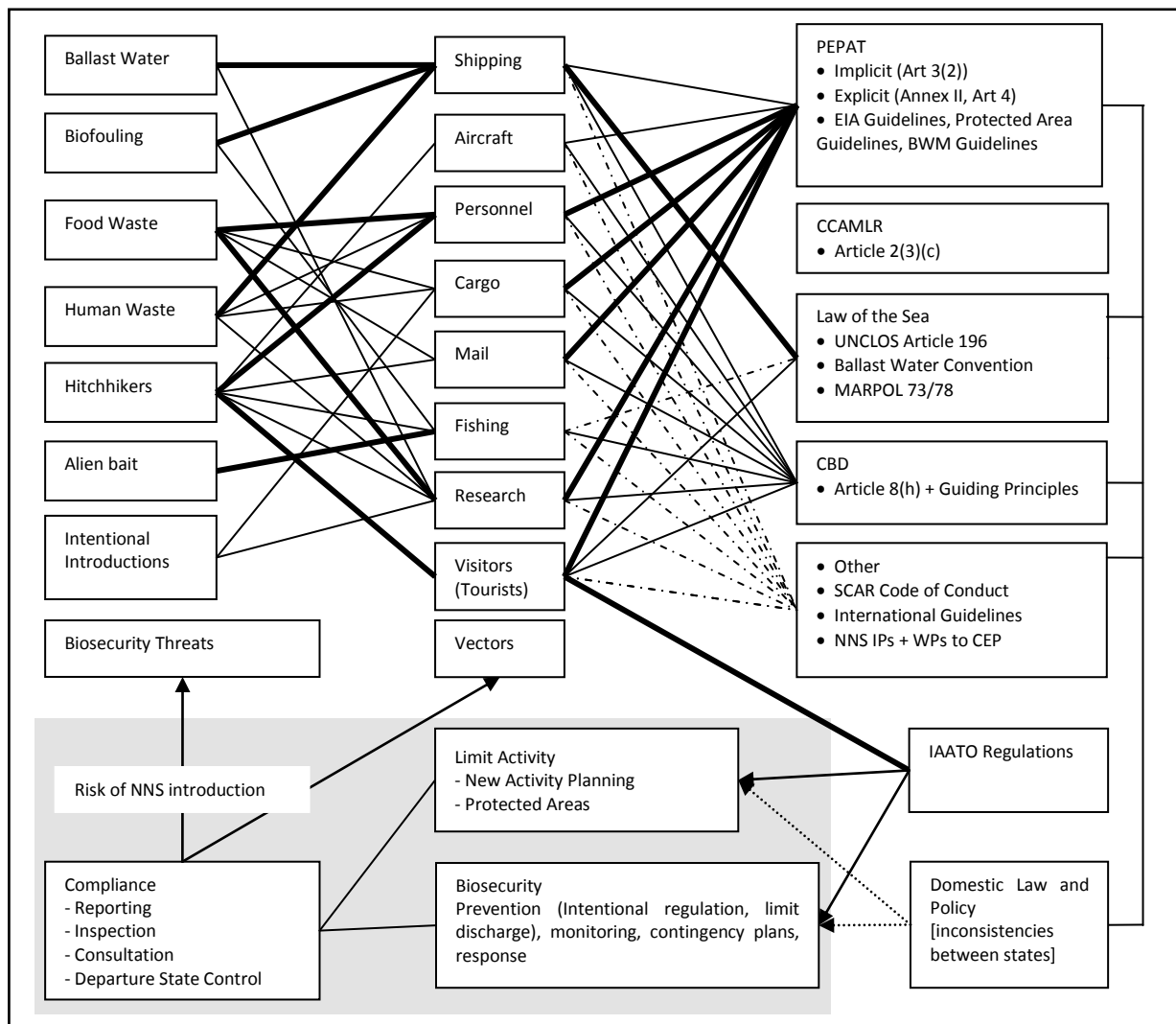


FIGURE 5.1: CURRENT RESPONSES TO THE RISKS OF NNS INTRODUCTION IN THE ANTARCTIC AREA¹²

The figure above demonstrates the number of interconnected regimes applying to AT Parties activity in the Antarctic and the lack of a single unitary regime. The proactive approach of New Zealand and Australia demonstrates biosecurity risks can be mitigated effectively by collaborating with domestic biosecurity agencies. The application of biosecurity policy to NAP activity and effectively limiting tourist and fisheries activity represents a model of best practice. However, limitations at the international level mean that considerable gaps and inconsistencies remain, particularly in relation to high-risk aspects of activity, sewage disposal, biofouling of ship surfaces and ballast water management.¹³ Moreover, other AT Party States do not have the same level of domestic biosecurity,

¹² Heavier weight line indicates strong connection between variables, dotted line indicates only hortatory guidance. Shaded area indicates the actual measures employed.

¹³ See Figure 5.2 above.

indicated by the limited extent to which the States have implemented elements of the invasive species programme of the CBD. In addition, comparing Australia and New Zealand's Antarctic policies with the extensive biosecurity provisions for the sub-Antarctic demonstrates the limitations of jurisdiction over activities rather than geographic areas. Preventative biosecurity measures ideally rely on a nation employing border control mechanisms based on territorial sovereignty and legitimate maritime zones.¹⁴ Restricting jurisdiction to nationalities means the best practice of a number of States will be undermined by one State adopting a laissez-faire approach to the activities under its control. The 2008 COMNAP survey of 15 National Antarctic Programs that together run 70% of all Antarctic stations suggest AT Parties have adopted an informal approach to the management of NNS. Although 53% adopted monitoring and surveillance programs and 38% have implemented operational procedures that target NNS, the most prominent measure implemented by 86% of surveyed AT Parties is the "awareness program".¹⁵ Although this is an important component, consistent operational procedures are needed to effectively minimise the risks of NNS introduction.¹⁶ Similar issues are faced by a number of States and regional organisations that have developed biosecurity systems incorporating transboundary cooperation or collaboration between sectoral jurisdictions. The IUCN's work in addressing common problems in biosecurity management identifies priorities for the domestic response to NNS risks that are of particular significance in the Antarctic area. These include providing a cohesive framework for biosecurity consideration that identifies key objectives, comprehensive coverage and consistent terminology, cohesive institutional support and compliance measures that allow for both supervision and enforcement.

5.3. THE IDEAL FRAMEWORK

Comprehensively addressing the risks posed by NNS requires a strategic approach that surpasses the limited vision of the CEP work plan. Although PEPAT provides the structure for biosecurity consideration through the CEP and Annex II, Chapter Two of this thesis demonstrates that the ATS lacks in an integrated biosecurity framework and mechanisms to implement a framework. The ATS does not provide an adequate gateway to prevent the aspects or classes of activities that pose particular risks of NNS introduction or methods to evaluate whether individual States implementation of PEPAT is effective. There are three general aspects to any biosecurity strategy: the institutional foundation, substantive provisions and procedures to ensure compliance.

¹⁴ Shine, above n 6, 30.

¹⁵ COMNAP, *Survey on existing procedures concerning introduction of NNS in Antarctica* ATCM XXXI IP 98 (2008).

¹⁶ Shine, above n 6, 41.

Discussion on the most appropriate method of implementing the measures is reserved for the next section, except where necessary for the purposes of the analysis.

5.3.1 FOUNDATIONS

Establishing a strong foundation is particularly important in the Antarctic area, where jurisdiction based on nationality leads to variety in approaches to implementation across AT Parties.¹⁷ To achieve the level of consistency and precaution required to mitigate the risks of NNS introduction, the general objectives and guiding principles must be suitable for operationalisation at the regional level. As well as general requirements for AT Parties to take biosecurity measures on their own programs, the system needs to provide for institutional support that complements the institutions of both the regional and international approaches to biosecurity. A “framework approach” is adopted for this thesis, establishing objectives and terminology and an institutional framework to address the more substantive issues.¹⁸ A framework has benefits over an umbrella or comprehensive approach as it can adaptively respond to biosecurity risks as information about the baseline and the threats of ongoing activities emerge and build upon existing agreements.¹⁹

5.3.1.1. RISK SETTING: KEY OBJECTIVE, BROAD SCOPE AND SPECIFICALLY DEFINED TERMINOLOGY

The foundation of an effective biosecurity framework is a clear and concise set of objectives, with a broad scope and specifically defined terminology.²⁰ The lack of explicit objectives is a common problem in national regimes and can limit action on the risks of NNS unless there is a demonstrated threat to agro-forestry or fisheries interests.²¹ Despite the conceptual framework offered by the ATS, without an explicit statement of objectives, biosecurity action may be justified on the basis of national biosecurity practice, which may not be consistent with Antarctic values. Definitions “go to the heart of legal certainty” and especially where they will be implemented in different legal systems, clarity is essential.²² It is appropriate that addressing the ambiguous scope as well as lack of

¹⁷ K Bastmeijer, *The Antarctic Environmental Protocol and its Domestic Legal Implementation* (2003), 448-449.

¹⁸ D M McGraw, ‘The CBD – Key Characteristics and Implications for Implementation,’ (2002) 11 *Review of European Community and International Environmental Law* 1, 18.

¹⁹ *Ibid*, 19.

²⁰ Shine, above n 6, 43.

²¹ *Ibid*, 37.

²² *Ibid*, 44.

defined terminology and objectives should be one of the first steps in establishing a biosecurity framework for the Antarctic.²³

Firstly, the object and subject of biosecurity in the Antarctic must be defined adequately to address the scope of the framework. Although Annex II provides some guidance on the definition of species covered by the Annex and the AT area offers a specific geographic area, it does not provide definitions for the concept of introduction and only prescribes preventative action for micro-NNS.²⁴ AT Parties must provide clarification through a set of definitions consistent with domestic policy and relevant international conventions. The CBD Secretariat in collaboration with other international and regional organisations developed a concise set of standard definitions that are useful to examine in the Antarctic context.²⁵ The CBD definition of a NNS²⁶ is suitable for the Antarctic area, encompassing a broad definition of spatial and taxonomical criteria that can encompass all species groups and intra-continental transfers between sites.²⁷ The overlap with CCAMLR jurisdiction should not detract from the holistic framework focussing on all species, including those that spend all their lives in the water. The subject of the provisions, however, requires further isolation through establishing the object of the biosecurity process. Naturally dispersed NNS cannot come under human jurisdiction, so only those NNS that are introduced by human agency should be addressed by biosecurity. However, as that human agency can be intentional or unintentional and either cause the introduction or establishment of NNS, each element needs separate attention. The ambiguous way the ATS addresses “introduction”, without any clear distinction between intentional and unintentional introductions or establishments, can be rectified by adoption of the CBD’s partition of human agency into intentional and unintentional introductions and establishment, and addressing each in turn.²⁸

²³ Discussed in more detail at below, Section 5.3.1.1.

²⁴ See above, Chapter 2, Section 2.2.1.2.2.

²⁵ CBD COP, *Guiding Principles for the Implementation of Article 8(h)* Decision VI/23 (2002), n57; see also CBD, *Glossary of Terms* <<http://www.cbd.int/invasive/terms.shtml>> at 01/02/2010; a CBD webpage aimed at providing definitions agreed on the international level.

²⁶ Strictly alien species, interchangeable with NNS, Shine, above n 6, 1.

²⁷ i. “[non-native] species” refers to a species, subspecies or lower taxon, introduced outside its natural past or present distribution; includes any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce, CBD COP, above n 24, n57.

²⁸ Shine, above n 6, 34; “ii. “invasive alien species” means an alien species whose introduction and/or spread threaten biological diversity...”, *ibid.*

iii. “introduction” refers to the movement by human agency, indirect or direct, of an alien species outside of its natural range (past or present). This movement can be either within a country or between countries or areas beyond national jurisdiction. *Ibid.*

iv. “intentional introduction” refers to the deliberate movement and/or release by humans of an alien species outside its natural range.” *ibid.*

v. “unintentional introduction” refers to all other introductions which are not intentional, and

However, a framework cannot target all the risks of introduction. A strict zero tolerance approach to risks²⁹ would completely exclude human interaction with the Antarctic, which is undesirable and inconsistent with the goals of peaceful and scientific activity in the ATS.³⁰ Biosecurity is not an end in itself but is a mechanism for the protection of certain values in an area.³¹ PEPAT confirms and defines the inherent values of Antarctica under the ATS.³² Any biosecurity objectives must include the protection of the Antarctic environment and its dependent and associated ecosystems and the scientific, aesthetic and wilderness values of the area. The objectives must also be consistent with other relevant legal obligations, including the rational use of Antarctic marine living resources in CCAMLR as well as the other general provisions relevant to NNS found in international environmental law, particularly Article 8(h) of the CBD and Article 196 of UNCLOS.

The focus on multiple objectives can undermine a biosecurity framework through permitting acceptable risks in the context of more prioritised concerns, especially where there is no systematic hierarchy of risk.³³ The Lake Vostok CEE ultimately involved Russia deciding to place the scientific and potential commercial³⁴ value of drilling into the lake above the potential damage to the lake's scientific, wilderness and environmental values by contamination.³⁵ The adoption of a strict precautionary approach reflects the recommendations of both the CBD and IUCN and is appropriate in the context of Article 3 of PEPAT.³⁶ To reflect this approach, the introduction or establishment of NNS should always be defined as a more than minor or transitory impact on the Antarctic environment. Action should be rationalised by taking into account the probability of an activity introducing NNS and the extent to which the activity is necessary in the context of the values the biosecurity regime protects. The higher the probability the activity will introduce NNS, the stronger the onus on the activities proponent to demonstrate the activity is necessary to retain the value of the ATS.³⁷ Thus, the main focus of AT Parties should be "biosecurity threats": those matters or

vi. "establishment" refers to the process of an alien species in a new habitat successfully producing viable offspring with the likelihood of continued survival," *ibid.*

²⁹ Australia, France and New Zealand, *A work program for CEP action on NNS* ATCM XXXII WP 05 (2009), Recommendation 1.

³⁰ See above Section 1.3.

³¹ *Ibid.*

³² PEPAT, Article 2, 3.

³³ M Jay, M Morad and A Bell, 'Biosecurity: a policy dilemma in New Zealand' (2003) 20 *Land Use Policy* 121, 126.

³⁴ Bastmeijer, above n 17, 347.

³⁵ See for example: *Ibid.*, 346-348.

³⁶ See Chapter 1.3; CBD COP, above n 24, Guiding Principle 1; Shine, above n 6, 34.

³⁷ See A Trouwborst, 'The Precautionary Principle in General International Law: Combating the Babylonian Confusion', (2007) 16 (2) *Review of European Community and International Environmental Law* 185, 188.

activities which, individually or collectively, significantly increase the risk of NNS introduction or establishment.³⁸

Consolidating these issues, an appropriate key objective is “to prevent or minimise biosecurity threats in the AT area consistent with the protection of the Antarctic environment and its dependent and associated ecosystems; the value of the continent to scientific study and the aesthetic and wilderness values of the area under PEPAT; conservation and rational use of Antarctic marine living resources under CCAMLR and other relevant international law.” Any further enunciation of the objective complicates its application. This objective identifies the underlying and interlinked goals of the system:

- Precautionary approach to management of biosecurity threats.
- Consistency with legal obligations in the ATS and wider international system.
- Conservation of Antarctic environment, and dependent and associated ecosystems.
- Protection of the intrinsic value of the AT area under Article 3, PEPAT.
- Consistency with the freedom of scientific investigation under Article II of the AT and the rational use of Antarctic marine living resources under Article 2 of CCAMLR.

³⁸ Adapted from IUCN Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species (2000), 3.

5.3.1.2. GUIDING PRINCIPLES

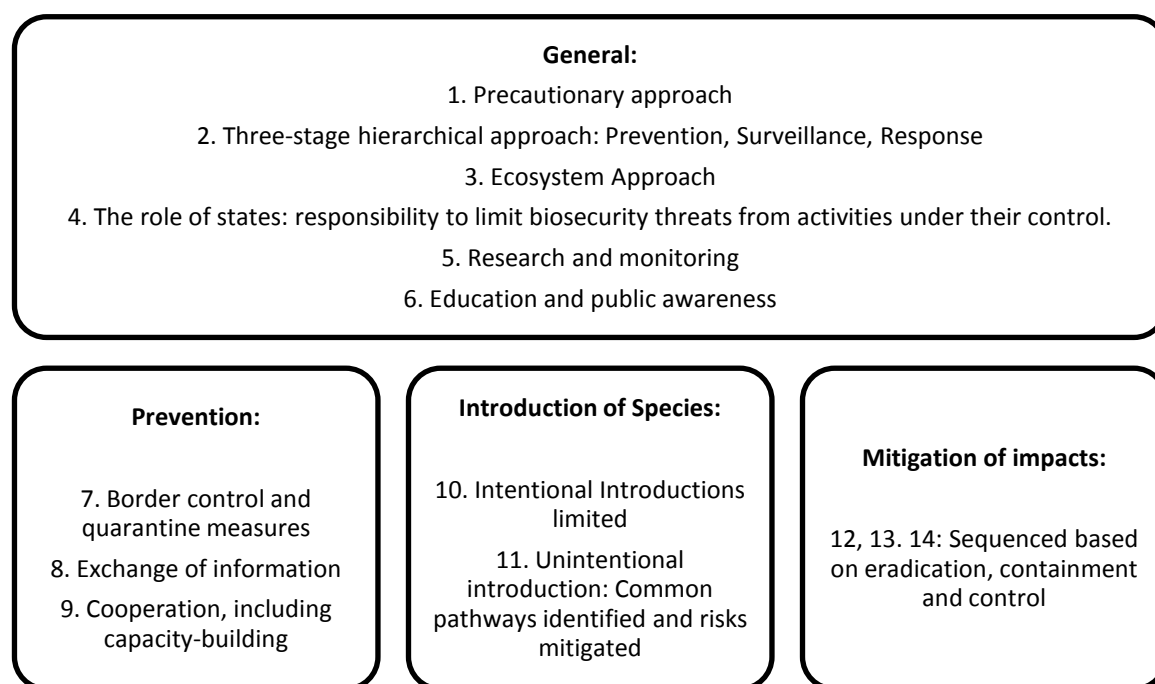


FIGURE 5.2: GUIDING PRINCIPLES FOR IMPLEMENTATION OF ARTICLE 8(H) OF THE CBD³⁹

The limited impact of an objective without substance is evident in the CBD’s response to invasive species.⁴⁰ Guiding principles elaborate objectives allowing AT Parties to harmonize objectives and scope and indicate the underlying ideological framework for biosecurity interventions without the considerable negotiation and compromise necessary for binding measures. These should ultimately reflect international best practice and include the ecosystem based management focus on prevention and precautionary approach identified in Chapter One.⁴¹ An onus should be placed on the role of cooperation between domestic biosecurity regimes. States with effective biosecurity should play an active role in sharing expertise and actively assisting programs meet the ambitious objectives. The AAD has already compiled a list of “Quarantine Principles” underlying its program that reflect a precautionary approach.⁴² In addition, the Guiding Principles offer an opportunity to increase the consistency and collaboration between the CBD and ATS, and allow for integrated implementation at the domestic level. The guiding principles in the context of the CBD have provided “useful guidance for work on invasive species, and for raising awareness among national

³⁹ CBD COP, above n 24, Annex.

⁴⁰ See McGraw above n 18, 21.

⁴¹ See Chapter 1, Section 1.3.

⁴² Australia, *Principles underpinning Australia’s approach to Antarctic quarantine management* IP 44/ATCM XXIX, (2006).

and regional authorities and organizations about the ways and means for addressing invasive species.”⁴³ The CBD approach is evident in the AT Parties response in the Antarctic, WP 05 (ATCM XXXII 2009) confirming a precautionary approach to biosecurity as well as a focus on the three stage hierarchical approach of prevention, surveillance and response. PEPAT implicitly applies the ecosystem approach in providing for the comprehensive protection of the Antarctic environment and associated and dependent ecosystems, with shared information and international cooperation a foundation of the ATS. In addition, the precautionary approach to intentional introductions is consistent with the permit approach of Annex II, Article II of PEPAT. The CBD Guiding Principles should form the template where a more precautionary approach that reflects the intricacies of the Antarctic area can be developed. However, the controversy surrounding benefit sharing should be avoided.

A focus on the risks of NNS being introduced from Antarctica to other areas is an area that requires enunciation in the principles. The risk of the Antarctic as a dispersal location may pose a significant threat to AT Party interests. Identifying biosecurity threats in the Antarctic area as threats to areas outside the AT area is an important role of the guiding principles. Most countries already treat the Antarctic as a separate territory for the purposes of quarantine and engage in normal customs processes when personnel and visitors return.⁴⁴ Practically, the ATS should not address the issue formally, as it involves the development of domestic biosecurity procedures. The Guiding Principles can offer an appropriate option: informal guidance on implementing relevant biosecurity measures in departing from the Antarctic.

5.3.1.3. INSTITUTIONAL GUIDANCE: A SUBSIDIARY GROUP ON NNS

Institutional support, in the form of a dedicated biosecurity advisory body concerned with implementing the key objectives and guiding principles, is necessary in the context of ATS biosecurity. NNS issues currently come under the CEP’s mandate.⁴⁵ Despite the NNS issue being afforded top priority, an increasing workload limits the capacity of the CEP to adequately address even the higher priority issues. The Biosecurity ICG has been set up to address this issue and the work plan establishes five years of ascertainable objectives and scope for expansion. However, the

⁴³ CBD Executive Secretary, *In-Depth Review of Ongoing Work on Alien Species that Threaten Ecosystems, Habitats or Species* UNEP/CBD/COP/9/11 (2008), [63].

⁴⁴ See for example: Australia, *IEE: Upgrade of organic waste management equipment, procedures and associated infrastructure at Australia’s Antarctic stations* (2008), 27.

⁴⁵ Including those relevant to fisheries: Chapter Two, Section 4.1.

ICG is not a permanent institutional response and is not strategically designed to act as an advisory body to the ATCM on the issue of biosecurity. There are several options for institutional response within the ATS. The Antarctic Secretariat is a permanent institutional arrangement of the ATS, providing ongoing support for the ATCM. It is an organ of the ATCM but is empowered to “perform those functions in support of the ATCM and the CEP, which are entrusted to it by the ATCM.”⁴⁶ It is also empowered with an operational budget, giving it the advantage over other arrangements in the ATS reliant on AT Parties sponsorship. AT Parties have resisted the institutionalisation of the ATS, however, and negotiating an appropriate expansion of the role of the Secretariat may pose difficulties or significant compromises for biosecurity.

The CEP can establish subsidiary bodies with the approval of the ATCM.⁴⁷ Previous experience with the SGMP has shown that more permanent groups, communicating via electronic means, are more effective than an ICG.⁴⁸ While the ICG can effectively address a set of objectives, a more permanent group can fulfil more systematic tasks within the ATS. A permanent Subsidiary Group to the CEP on NNS (‘SGNNS’) could fulfil a purpose similar to the treatment of NNS as a cross cutting issue by the CBD, integrating biosecurity considerations into the ATS. The group should be created with four key terms of reference and the scope to expand as the ATS develops. In its early stages, it should promote and consolidate risk analysis activity and environmental management activity relevant to NNS. This could be achieved through consultation and collaboration with an appropriate working group of the SC-CAMLR, SCAR SSG-LS, and COMNAP. With a focus on risk management, the group could collaborate with the CEP in advising for the integration of biosecurity consideration into relevant Annexes and recommendations under PEPAT. The SGNNS could also promote the integration of biosecurity into more systematic changes to the ATS, for example, SEA, a reporting regime or strategic inspections. SEA, biosecurity and strategic inspections offer appropriate areas for the SGNNS to analysing gaps in the implementation of biosecurity and suggest improvements. In order to effectively operate as a biosecurity advisory group, it should be composed of biosecurity experts. Membership should be open to any Party, but require previous biosecurity experience and the chair of the committee should be appointed based on that experience. Given the body will be made of experts, its operation should be as transparent as possible and all members should be encouraged to participate across consecutive intercessional periods to promote consistency. The

⁴⁶ ATCM, *Secretariat of the Antarctic Treaty* ATCM XXVI Measure 1 (2003); ATCM, *Provisional application of the Secretariat Measure* ATCM XXVI Decision 1 (2003).

⁴⁷ ATCM, *Revised Rules of Procedure for the CEP* ATCM XXXII Appendix to Decision 6 (2009), Rule 10.

⁴⁸ Brazil, *Report on the Effectiveness of the Trial Informal Group* ATCM XXXI WP 57 (2008).

operation of the SGNNS should be achieved through electronic methods of communication, particularly utilising collaborative software and encouraging public participation where appropriate.⁴⁹ Collaborative software, in particular wiki technology, is a method of electronic collaboration that is not widely utilised in governance⁵⁰ but could provide a transparent and adaptive core for intercessional biosecurity discussion. In particular, reporting of biosecurity measures could be categorised, and each nations approach discussed in relation to identified risks. If this is done as measures are implemented, it would constitute an active form of adaptive management, with the potential to address risks proactively and reactively.

The objectives and operational procedures should complement the approach of the Biosecurity ICG. The body should be responsible for promoting and integrating risk analysis across all National Antarctic Programs, tourist operations and fishing activity based on the techniques already in place in domestic programs.⁵¹ An important role of the body should be consultation with relevant agencies and establishing a clear responsibility to address developments in the CBD, GISP, IMO and other relevant international legal bodies should be a priority. The role of the CBD within the ATS remains negligible,⁵² yet AT Parties would greatly benefit from integrating the expertise of the CBD into the biosecurity framework. In addition, the Antarctic could provide a key case study for the CBD in protecting the biodiversity of international spaces, and increase the transparency and potentially acceptability of the ATS environmental management regime in the international community. The SGNNS should also play an important role in the development and implementation of mechanisms to support biosecurity discussed in the next section.

⁴⁹ The importance of the movement of information onto the internet for transparency is well established, D Vidas and B Njastad, 'The ATS on the Web: Introducing Modern Information Technology in Antarctic Affairs,' in D Vidas (ed.) *Implementing the Environmental Protection Regime for the Antarctic* (2000); see also; R Godwin-Jones, 'Blogs and wikis: Environments for on-line collaboration' (2003) 7(2) *Language, Learning and Technology* 12 and P Laihonon, *et al*, 'Geospatially structured biodiversity information as a component of a regional biodiversity clearing house' (2003) 12 *Biodiversity and Conservation* 103, 104-5.

⁵⁰ Godwin-Jones, *ibid*, 15.

⁵¹ See for example: S P Worner, 'Tools for Risk Assessment and Management of Non-Native Species,' in M Rogan-Finnemore (ed.), *Non-native Species in the Antarctic Proceedings* (2008).

⁵² See Chapter 3, Section 3.2.1.4.

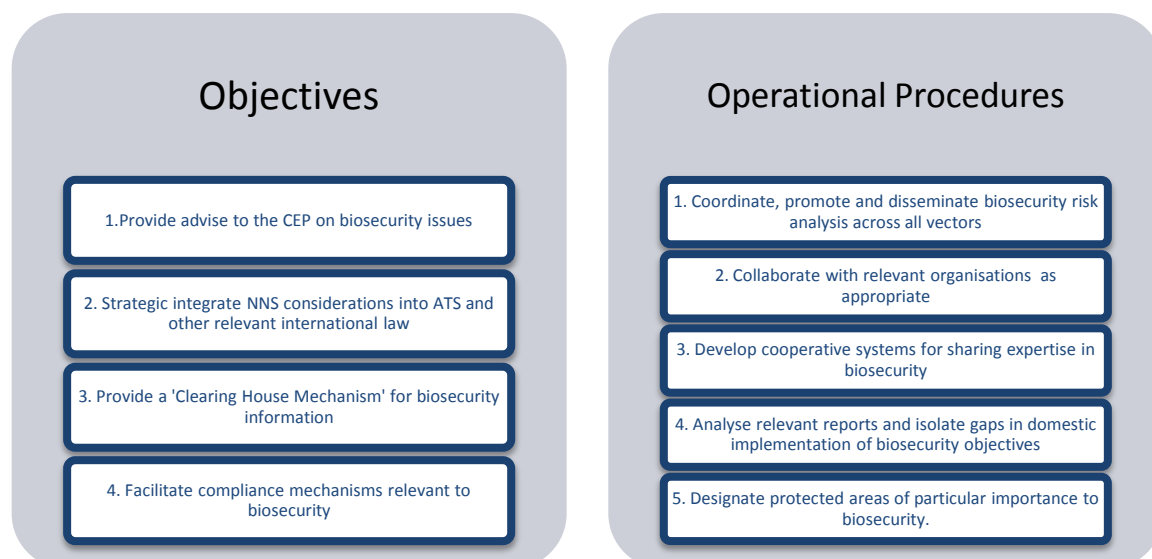


FIGURE 5.4: TERMS OF REFERENCE FOR THE SUBSIDIARY GROUP ON NNS

5.2.2. SUBSTANTIATING THE FRAMEWORK: ANALYSING AND RESPONDING TO NNS RISK

Any substantiation of the guiding principles should be undertaken in the context of risk analysis. The analysis of risk is fundamental to biosecurity and involves three basic processes: risk assessment, risk management and risk communication.⁵³ The assessment looks at “the size and nature of the potential adverse effects” of a potential introduction and the probability of the effects happening.⁵⁴ The focus should be on all pathways of introduction and identifying activities which are likely to increase the risk of NNS introduction significantly.⁵⁵ A considerable amount of risk assessment has already identified the aspects of activities that pose a considerable threat to the Antarctic environment through their potential to introduce NNS.⁵⁶ However, the focus of AT Parties should be incorporating risk analysis into the relevant mechanisms governing conduct under the ATS and the international system. The full scope of comprehensive measures to exclude NNS risks is too wide a subject to cover but this section will examine several key components necessary to limit risks associated with NNS. In addition, the section will explore the extent the subsidiary group on NNS can guide the development and utilise the components.

⁵³ Shine, above n 6, 35.

⁵⁴ Ibid.

⁵⁵ See for example: Figure 5.5 below.

⁵⁶ See Chapter 1.2.

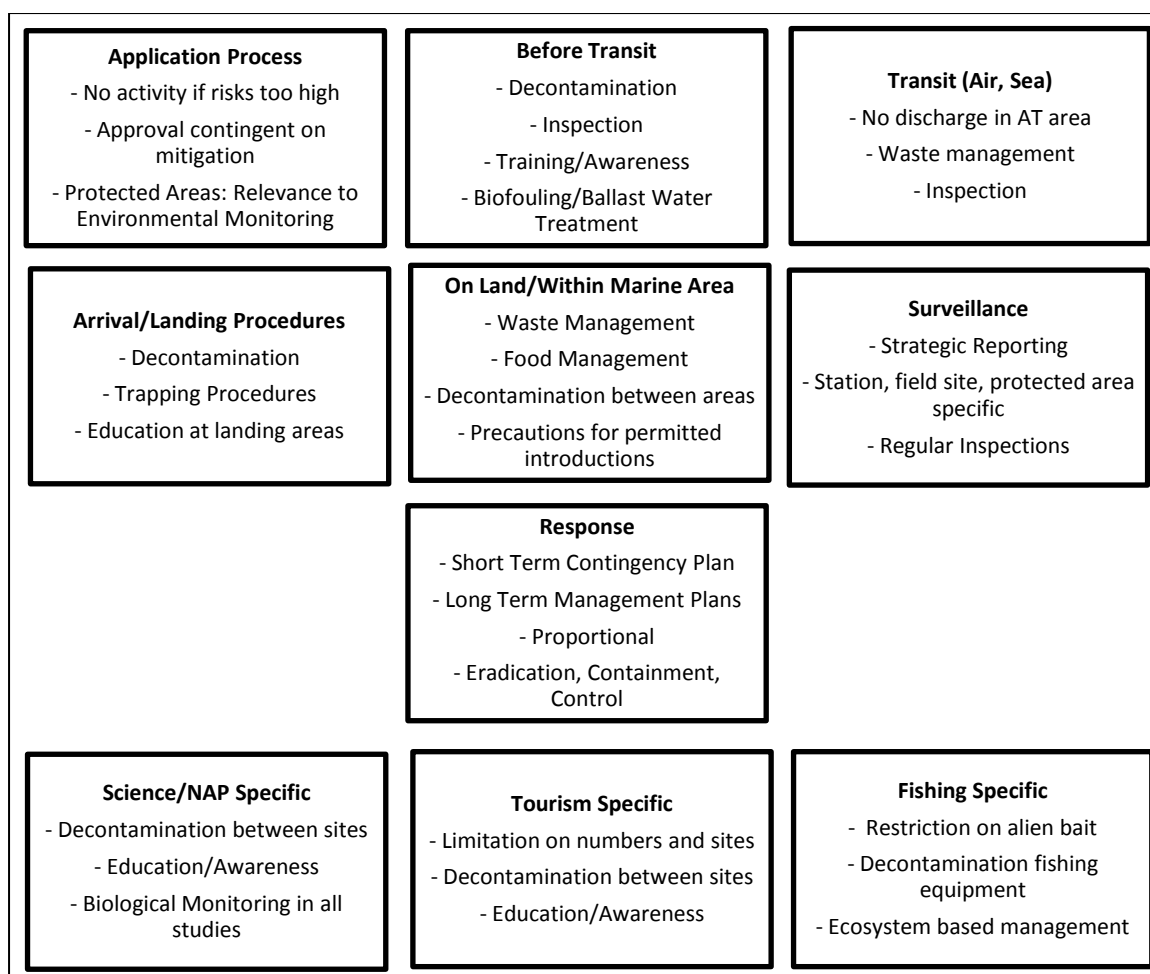


FIGURE 5.5: SUGGESTED AREAS TO BE COVERED BY THE SUBSTANTIVE ASPECTS OF BIOSECURITY FRAMEWORK

5.3.2.1 PLANNING FOR PREVENTION: EIA, SEA, CONTINGENCY AND MONITORING

A crucial step in implementing a risk based approach to Antarctic biosecurity is ensuring the planning of activity in the Antarctic area takes into account the biosecurity threats of the proposed activity. There are several steps to this process that need to be separately addressed by a biosecurity framework. The overall strategic plans, programs and policies of AT Parties and Antarctic operators determining the quality and quantity of Antarctic activity have a significant impact on the risks of NNS introduction. The systematic biosecurity threats of Antarctic activity should be addressed at the strategic level, including mitigating the cumulative impacts of different tourist operators and NAPs operating in the same geographic area. The planning of specific activities will also involve certain biosecurity threats and the Annex I EIA process provides a limited obligation to evaluate the risks and consider potential mitigation measures. Finally, comprehensive and region-specific contingency plans should be introduced to all Antarctic stations to provide for both short term and long term

response in the case of NNS introduction and establishment. The Disease ICG has identified a draft contingency plan in the case of outbreak. Further development of effective contingency measures, modelled on the comprehensive provisions in the NZSAI, is relatively uncontroversial and can be done in the context of the CEP's integration of biosecurity into existing processes. This section will focus on the development of more strategic and informed impact assessments for planning purposes to target a wider scope of biosecurity threats in the Antarctic.

The planning of specific activities and the provision for contingency plans are expressly provided by PEPAT, although neither expressly invokes biosecurity considerations in the text of the Annexes. One area of particular concern is the domestic implementation of the EIA process, with a number of commentators identifying discrepancies in the quality and quantity of submissions.⁵⁷ Chapter Two indicates that some AT Parties systematically include biosecurity considerations in their EIA submissions. AT Parties need take consistent steps to assess and mitigate against biosecurity threats in the planning of new activities. Guidance on the term "minor or transitory" can reduce the inconsistencies in domestic implementation. Given the considerable datasets now open to AT Parties after more than 10 years of EIA implementation, an informed decision on the types and extent of activities that constitute a more than minor or transitory impact should be possible. This process could involve an extensive risk analysis of the types of activities and aspects of activities that have the potential to introduce NNS. Where NNS introduction or establishment is deemed likely, the impact should be at least minor or transitory. Its status as "more than minor or transitory" should depend on the likelihood of the NNS to breach natural and artificial barriers.

Strategic planning is already required by Article 3 of PEPAT. As well as planning to avoid impacts to biodiversity and habitats, the Article requires ongoing monitoring of activity, ensuring planned activities do not have unforeseen impacts. However, other than providing for Annual Reports and unlike the EIA mechanism for new activities or changes to activities, there is little within the ATS that supports the implementation of strategic planning to avoid environmental impacts. In domestic systems, the EIA process is usually in the context of a wider strategic assessment of the suitability of the type of activity in an area.⁵⁸ The Antarctic policies of States, individually and collectively, are not addressed by the EIA process. Introducing SEA into the ATS provides for the strategic analysis of the policies of AT Parties, "moving towards joint EIAs covering large geographical areas, including all

⁵⁷ CEP Report XII (2009), 38-40.

⁵⁸ A Hemmings and R Roura, 'A square peg in a round hole: fitting impact assessment under the Antarctic Environmental Protocol to Antarctic tourism,' (2003) 21(1) *Impact Assessment and Project Appraisal* 13, 21.

actors involved in that area.”⁵⁹ The SEA allows AT Parties to examine whether the types of activities proposed or the particular policy is likely to significantly increase the risks of NNS being introduced and whether that increase in risk is acceptable. The process could also provide the opportunity for AT Parties to ensure appropriate mitigation measures are built into the strategy of new programmes in the Antarctic.

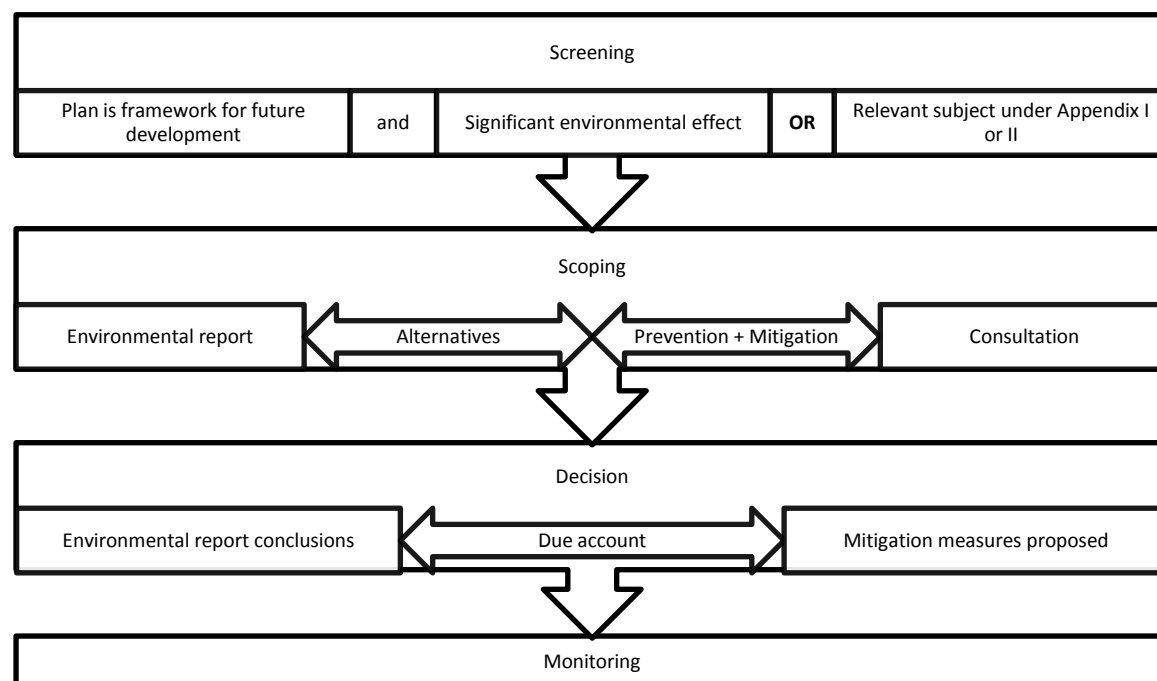


FIGURE 5.6: FRAMEWORK FOR THE ANTARCTIC APPLICATION OF THE SEA PROCESS BASED ON THE SEA PROTOCOL⁶⁰

A model for the implementation of SEA is provided by the SEA Protocol to the ESPOO Convention.⁶¹ Although only nine AT Party States have ratified the Protocol and its primary focus is “particularly harmful stationary activities”, its structure as the only binding substantive treaty on SEA is worth considering for adoption in the Antarctic area.⁶² In addition, the issues it addresses offer potential development for the EIA process. The primary difference with the EIA process is the scope of the SEA

⁵⁹ Y Kakasabe, *The Antarctic Protected Areas System: Challenges and practice* (a key note address at the second Antarctic Protected Areas Workshop, Lima, Peru, 22-23 May 1999) cited in Bastmeijer above n 17, 459.

⁶⁰ Adapted from *Convention on Environmental Impact Assessment in a Transboundary Context*, opened for signature 25 February 1991. 1989 *United Nations Treaty Series* 309 (entered into force 10 September 1997) and *Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context*, opened for signature 21 May 2003. S Marsden, *Strategic Environmental Assessment in International and European Law: A Practitioners Guide*, 287 (not in force) (“SEA Protocol”).

⁶¹ G Stoeglehner and G Wegerer, ‘The SEA-Directive and the SEA-Protocol adopted to spatial planning – similarities and differences’ (2006) 26(6) *EIA Review* 586, 597.

⁶² See Figure 5.6 above.

Protocol. The screening process identifies plans, programmes and policies of Parties requiring SEA. The process under the SEA Protocol explicitly excludes non-governmental plans⁶³ and exhaustively lists a number of activities already prohibited in the Antarctic area.⁶⁴ However, if a plan or programme sets out a “framework for future development consent” and it is “likely to have significant environmental impacts”⁶⁵, an SEA is required under the Protocol. It is this latter definition which is useful for the Antarctic area. First, if a particular AT Party or AT Parties collectively wish to introduce a new category of activities that are likely to have significant environmental impacts, the plan or programme for those activities should be examined by the SEA. SEA is a costly and lengthy process⁶⁶ and adopting a strict environmental analysis for every policy change could limit the reactivity of the ATS to environmental issues. A suitable threshold for Antarctic activity, incorporating the wording of Annex I, is if the policy, plan or programme is to have a “more than minor or transitory impact” on the environment and apply where a new policy, plan or programme is proposed or where the change proposes “the increase or decrease in the intensity of an existing activity.”

The SEA Protocol distinguishes between plans and programmes, and policy. Parties are only required to “endeavour to ensure that” a SEA is carried out in the latter.⁶⁷ This is not an appropriate distinction to make in the Antarctic. The plans and programmes of Antarctic National Programs should be under the scrutiny of AT Parties through the PEPAT reporting process. New policy, if it meets the threshold, should be accorded the same consideration as new plans or programmes. It is the evaluation of that policy that is one of the beneficial aspects of the SEA process, providing for a higher level examination of AT Parties’ approaches to the Antarctic. Although each SEA Protocol Party is responsible for carrying out SEA on its own plans, policies and programmes, a similar process in the Antarctic could allow the CEP and AT Secretariat to evaluate the collective policy of AT Parties towards Antarctica. For example, if AT Parties were to legitimise bio prospecting, the AT Secretariat could be empowered to carry out a SEA to ensure the activity fits within the ambit of PEPAT’s Environmental Principles and appropriate mitigation measures are taken to ensure that it does.

⁶³ SEA Protocol, Article 2.5(a) and 2.5(b).

⁶⁴ SEA Protocol, Annex I and II, c.f. some aspects of Annex I and Annex II are relevant, Waste Water treatment plants, waste disposal installation (including landfill), airports, see above n 117.

⁶⁵ The criteria for determining the likely significant environmental, including health effect, includes “transboundary nature of effects” and “degree to which plan or programme will affect valuable or vulnerable areas including landscapes with a recognised national or international protection status”, encompassing the Antarctic area. Annex III, SEA Protocol.

⁶⁶ Stoeglehner and Wegerer, above n 61, 595.

⁶⁷ SEA Protocol, Article 13(1).

Moreover, any biosecurity policies implemented should be subject to careful impact assessment to determine if the policy effectively reduces the risks of NNS.

Consultation also plays an essential role in encouraging compliance in the SEA Protocol. Scoping under the SEA Protocol is similar to the Annex I EIA process, consisting of preparing an environmental report and consultation. The latter permits the input of a body like the SGNNS to examine the biosecurity content of a proposed plan, policy or programme and promoting appropriate mitigation measures or advise against anything that exposes the Antarctic environment to an unacceptably high risk. The environmental report under the SEA Protocol includes a consideration of the impacts, potential alternatives and mitigation measures and how “environmental objectives, established at international national and other levels” may have relevance to the program.⁶⁸ The clear environmental objectives established in PEPAT give this provision particular clarity in the Antarctic environment. Finally, the SEA Protocol requires Parties to take due account of the conclusions of the environmental report, measures to prevent, reduce or mitigate the adverse effects identified in the environmental report and the consultation in making a decision to proceed, and monitor impacts as they occur.⁶⁹ It is this last step which creates difficulties in the Antarctic context. A SEA regime does not guarantee that environmental considerations are implemented in decision making, although developing strategic compliance procedures could identify potential impacts and draw attention to those impacts in the consultation processes. Considerable work needs to go into developing an adequate SEA process for the Antarctic that incorporates biosecurity considerations.

5.3.2.2 ERECTING A CONTAINMENT FIELD: SPATIAL MANAGEMENT AND DECONTAMINATION MEASURES

The SEA process under ESPOO does little to implement the ecosystem approach into planning mandated by Article 2 and 3 of PEPAT, required for an effective biosecurity framework.⁷⁰ Moreover,

⁶⁸ See Article 6 and 7 SEA Protocol; Resource Manual to Support Application of protocol on SEA, Draft Final, UNENE & REC <<http://www.energyandenvironment.undp.org/undp/indexAction.cfm?module=Library&action=GetFile&DocumentAttachmentID=1733>>, 2003, A4.5-7; the Guidelines for ESPOO identify the CBD as a potential source for environmental objectives; Resource Manual to Support Application of protocol on SEA, Draft Final, UNENE & REC <<http://www.energyandenvironment.undp.org/undp/indexAction.cfm?module=Library&action=GetFile&DocumentAttachmentID=1733>>, 2003, A4.5-7.

⁶⁹ Article 11 and 12 SEA Protocol; SEA Protocol; Resource Manual to Support Application of protocol on SEA, Draft Final, UNENE & REC <<http://www.energyandenvironment.undp.org/undp/indexAction.cfm?module=Library&action=GetFile&DocumentAttachmentID=1733>>, 2003, A.4.6-7.

⁷⁰ Shine, above n 6, 31-32; S Riley, ‘Invasive Alien Species and the Protection of Biodiversity: the Role of Quarantine Laws in Resolving Inadequacies in the International Legal Regime,’ (2005) 17 *Journal of International Law* 3, 356.

despite expressly providing for the analysis of cumulative impacts,⁷¹ the EIA process is essentially limited to States' activities in a given area, rather than the cumulative impact of human activity in that area. Protected areas in the Antarctic provide an opportunity to integrate spatial planning procedures into a biosecurity framework, implementing additional protection for representative biologically sensitive areas and managing cumulative impacts in frequently used areas. The application of the "domains analysis" to the existing system is not a high priority for the CEP but marine spatial planning is a top priority.⁷² AT Parties already incorporate biosecurity consideration into almost all ASPA and ASMA management plans but area protection is not used strategically for the purpose of biosecurity. Moreover, the ASMA is not an effective legal tool for managing cumulative impacts as the "Code of Conduct" is not binding on AT Parties and a permit is not required before entry.⁷³ One way to better manage cumulative risks is strengthening the ASMA and employing it more widely. By introducing permit requirements and requiring compliance with management plans, ASMAs could be more effectively employed to limit the risks of NNS in shared areas.

Moreover, the SGNNS should play a role in examining the findings of the SGMP relevant to biosecurity. Although the latter is the most appropriate to identify the biosecurity protection found in a management plan, the SGNNS can evaluate whether the biosecurity measures identified are sufficient and suggest potential improvements. The impacts of any human activity on native microorganisms and thus potentially the scientific utility of an area cannot be addressed through decontamination procedures. The body can also have a role in the designation of areas that are of particular importance to biosecurity. In particular, designating and identifying pristine representative areas for wilderness value and only justifying entry for the purpose of research into the pristine natural environment of the area or monitoring, would be useful. In addition, providing a catalyst for AT Parties to collaborate on protecting areas of high use, modelled on the Larsemann Hills ASMA, would be appropriate.

The spatial management of biosecurity threats in the context of a strategic environmental impact analysis may identify risks, but the employment of appropriate decontamination procedures is necessary to reduce the risk of NNS introduction.⁷⁴ Cargo, personal equipment, waste, marine discharge from land and sea and the outside surfaces of marine equipment, including vessels, all

⁷¹ PEPAT, Annex I, Article 2(1)(b); Article 3(2)(f).

⁷² CEP, *Report of CEP XII (2009)*, Appendix 1: Five Year Plan of the CEP.

⁷³ Bastmeijer, above n 17, 460.

⁷⁴ Shine, above n 6, 64.

pose a biosecurity threat that can be mitigated if appropriately treated. Decontamination involves two steps: inspection and treatment.⁷⁵ Several information papers already identify potential methods of inspection and treatment processes on vehicles within the continent⁷⁶ and outside the continent.⁷⁷ In addition, IAATO already employs extensive decontamination procedures on tourist operations. However, requirements on the performance of decontamination may be inappropriate given the differences in transport arrangements and domestic biosecurity procedures. A required standard, equivalent to the BWM Convention's performance standard, employed for all transport vectors could adequately complement a strategic inspection regime, the components of which will be discussed later in the chapter. The SGNNS can play an essential role in this process, equivalent to the BWM Convention Secretariat in compiling information about treatment options and submitting to the CEP for consideration.

5.3.3 COMPLIANCE: EDUCATION, SUPERVISION AND ENFORCEMENT

One of the most significant gaps identified in the implementation ATS is the lack of compliance measures under Article X of the AT and Article 13 of PEPAT.⁷⁸ The complex jurisdictional issues in the Antarctic both complicate and necessitate innovative approaches to ensuring that both AT Parties and non-AT Parties consistently implement the substantive aspects of a biosecurity framework. A comprehensive biosecurity framework should be composed of three aspects of compliance. The most important is providing a comprehensive information sharing portal that can inform all relevant vectors of best practice biosecurity, current threats and responsibilities under the ATS and international law. The role of "developing attitudes" and self regulation amongst the community of States, operators and visitors is a strength of the ATS and should be exploited for the purposes of biosecurity.⁷⁹ A biosecurity framework would benefit from SGNNS as a hub of information, processing regular and strategic reports on station biosecurity measures, information on monitoring for NNS and best practice biosecurity provisions and providing recommendations to non-compliant stations. This should be supported by a strategic supervision process, whereby vessels and

⁷⁵ R Wittenberg and M J W Cock (ed.) *Invasive Alien Species: A Toolkit of Best Prevention and Management Practices* CAB International (2001), 81.

⁷⁶ United Kingdom, *Procedures for vehicle cleaning to prevent transfer of NNS into and around Antarctica* ATCM XXXII WP32 (2009); IAATO, *Decontamination Guidelines and the Introduction and Detection of Diseases in Antarctic Wildlife: IAATO's Perspective* ATCM XXVIII IP 97 (2005).

⁷⁷ Australia, *Australia's Antarctic Quarantine Practises* ATCM XXVII IP 71 (2004), 3.

⁷⁸ See Bastmeijer, above n 17, 445-446; F O Vicuña, 'Port State Jurisdiction in Antarctica: A New Approach to Inspection, Control and Enforcement' in D Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000), 47.

⁷⁹ W Bush, 'Means and Methods of Implementation of Antarctic Environmental Regimes and national Environmental Instruments: An Exercise in Comparison' in J Verhoeven, P Sands and M Bruce (eds.) *The Antarctic Environment and International Law* (2000), 38.

aeroplanes are inspected for NNS at the port, and stations, and arrival locations are inspected on the continent. Theoretically, in concert, education and the deterrent impact of surveillance should sufficiently secure compliance.⁸⁰ However, sanctions should be available in case violations are suspected.

5.3.3.1. EDUCATION AND REPORTING IN A CLEARING HOUSE FOR BIOSECURITY

Education is an essential aspect of encouraging biosecurity compliance. The discrepancy between AT Parties domestic biosecurity capacity highlights the need for a system to share expertise⁸¹ and disseminate information on biosecurity threats and NNS in the AT area. Although the AT and PEPAT provides a sufficient framework for the exchange of technical and scientific cooperation,⁸² the reliance on different agencies to coordinate that exchange limits its efficiency.⁸³ COMNAP addressed NNS as a strategic project in 2008-09 as part of the IPY Aliens in Antarctica project, and the action by SCAR⁸⁴ and IAATO⁸⁵ on the subject indicates the willingness of AT Parties and Antarctic operators to cooperate towards disseminating best practice guidelines. However, despite SCAR and IAATO recommending significant decontamination measures in relation to scientific research activities and tourists, COMNAP has not addressed the systematic disposal of untreated sewage in the AT area or provided procedures for decontamination of vessels, cargo and visitors. Without a single agency being responsible for the dissemination of biosecurity relevant information, a consistent level of precaution cannot be maintained.⁸⁶

A model is found in the CBD's Clearing House Mechanism designed to promote and facilitate technical and scientific cooperation among Parties, other Governments and stakeholders.⁸⁷ The institution has evolved into a global network of websites under the CBD main website, consisting of national clearing-house mechanisms and supporting agencies.⁸⁸ The institutional support for the information sharing mechanisms under the AT is provided by the AT Secretariat which manages the

⁸⁰ Bastmeijer, above n 17, 381.

⁸¹ See above, Section 2.1.4.

⁸² AT, Article 3; PEPAT, Article 1(a).

⁸³ See for example: F Francioni, 'Establishment of an Antarctic Treaty Secretariat: Pending Legal Issues' in D Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000), 135.

⁸⁴ SCAR, *SCAR's Environmental Code of Conduct for Terrestrial Field Research in Antarctica*, ATCM XXXII IP 04 (2009).

⁸⁵ IAATO, *Decontamination Guidelines and the Introduction and Detection of Diseases in Antarctic Wildlife: IAATO's Perspective* ATCM XXVIII IP 97 (2005).

⁸⁶ Shine, above n 6, 37.

⁸⁷ CBD, Article 18; CBD COP, *Clearing-House mechanism for technical and scientific cooperation*, Decision I/3 (1994); Laihonon, above n 49, 104.

⁸⁸ CBD Executive Secretary, *Scientific and Technical Cooperation and the Clearing House Mechanism: Proposals for the implementation of the strategic plan of the clearing house mechanism* (2008) UNEP/CBD/COP/9/23, (1).

dissemination of information.⁸⁹ The clearing house is based on the philosophy that broad participation and easy access must be a top priority, which has also underpinned recent developments in the AT Secretariat.⁹⁰ The CBD Clearing House is coordinated by the Executive Secretary, but guided and overseen by an Informal Advisory Committee set up by the Parties to the Convention.⁹¹ Although several IPs support and demonstrate the implementation of the Biodiversity Database for recording and disseminating information about present NNS,⁹² there is no overarching, specific mechanism for disseminating information relevant to biosecurity. Nevertheless, the active cooperation and collaboration on the issue and EIES provide a robust foundation and approximation of a Clearing House Mechanism in the Antarctic context. The SGNNS could play an important role in facilitating information and expertise exchange between countries with sophisticated biosecurity processes and those with less developed procedures. In addition, the SGNNS should collaborate with COMNAP, CCAMLR, IAATO, the AT Secretariat and relevant AT Parties to promote research and development of gaps in the system and integrate considerations within the individual bodies.

The annual reports required by Article 17 of PEPAT could be utilised for recruiting the necessary information from AT Parties. Other than providing for the EIES, AT Parties have taken no steps to elaborate the reporting process. The CBD developed reporting templates to serve the utility of the system for compliance. Generally worded provisions can communicate qualitative details more effectively but for the purposes of compliance, quantitative scales are more appropriate. A possible option would be for the EIES to identify whether a Party has analysed biosecurity risks from all its Antarctic activities and then the presence or absence of specific mitigation measures in a template. The template could resemble the approach of the CBD Third National Reports. Although the low levels of implementation amongst AT Parties in the Third National Reports to the CBD does not indicate such an approach will measurably increase compliance, it will encourage States to annually review their biosecurity procedures and have access to the measures adopted by other countries. The development of reporting measures should also attempt to incorporate the internationally harmonised approach under UNEPs World Conservation Monitoring Centre.⁹³ Integrating the manner in which reporting information is presented between global and regional instruments that concern the same subject matter provides legal certainty on the responsibilities under the

⁸⁹ See for example: Francioni, above n 83, 147.

⁹⁰ Francioni, above n 83, 148.

⁹¹ Ibid, Annex I.

⁹² New Zealand, *The Invasive Species Database* ATCM XXX WP 37 (2007); Australia, *Antarctic Alien Species Database* ATCM XXXI WP 16 (2008).

⁹³ D M McGraw, above n 18, 21; P Herkenrath, *Options for harmonizing national reporting to biodiversity-related agreements* UNEP-WCMC Information Document (2005).

conventions and enables more consistent decision making processes.⁹⁴ Although Antarctic-specific reporting templates are necessary,⁹⁵ integrating the approach of the CBD, particularly in AT Parties including approaches to the Antarctic in their NBSAPs and National Reports, will increase transparency and consistency between biodiversity conventions, allowing more efficient implementation at the domestic level.

5.3.3.2. STRATEGIC SUPERVISION: CONSULTATION AND PORT STATE CONTROL

The importance of AT Parties supervision for ensuring compliance is evident in almost every mechanism under the ATS. AT Party compliance is discussed in the CEP, CCAMLR and ATCM informed by a number of reports required by the relevant instruments. It is therefore appropriate that supervision processes should be adapted strategically to ensure compliance with biosecurity measures. Inspection and monitoring processes and reports should proactively address biosecurity threats and enable discussion at the regional level. A significant gap, however, is evident in the high seas where inspection has only been developed in relation to fishing activities under CCAMLR and not for compliance with PEPAT generally or pollution conventions.⁹⁶ Where appropriate, Antarctic port states should exercise their discretion to inspect incoming vessels and aircraft to ensure compliance with biosecurity measures.

⁹⁴ J Harrison and M Collins, 'Harmonising the information management infrastructure for biodiversity-related treaties,' (Paper presented at the the United Nations University International Conference on Inter-linkages: Synergies and Coordination between Multilateral Environmental Agreements, Tokyo, Japan, 1999).

⁹⁵ UNEP-WCMC, *Preconditions for harmonising of reporting to biodiversity-related multilateral environmental agreements* (2009).

⁹⁶ Vicuña, above n 78, 67.

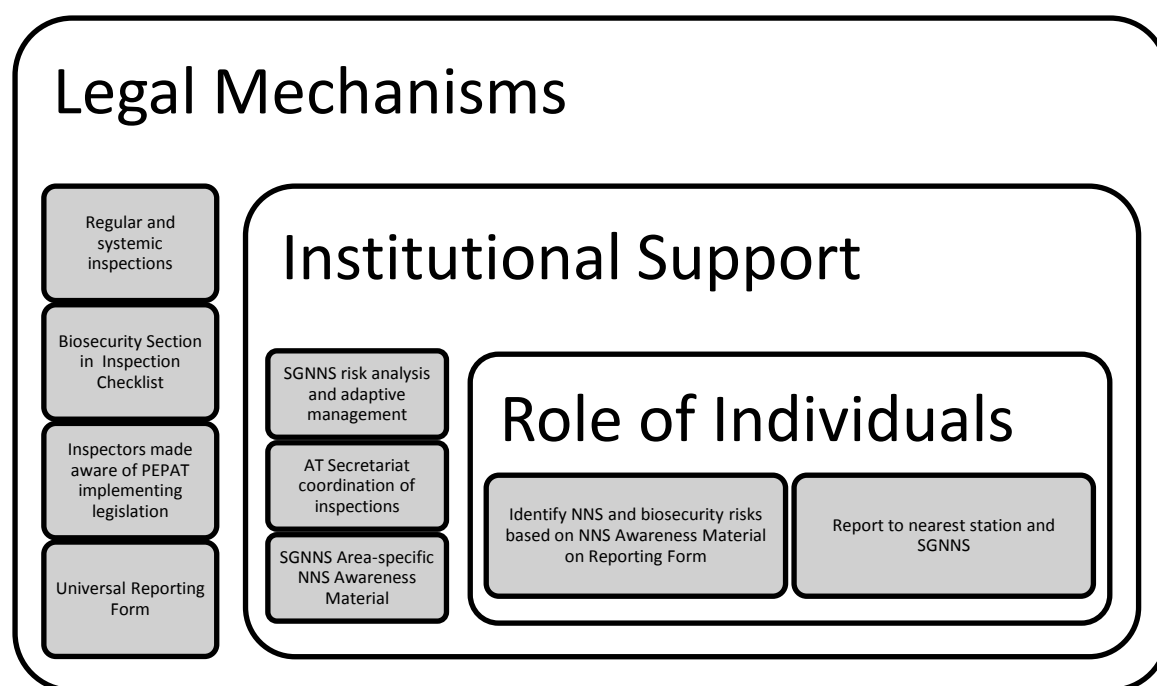


FIGURE 5.7: RECOMMENDED STRUCTURE OF STRATEGIC INSPECTIONS AND MONITORING

Inspection is the primary form of supervision in the ATS and without a strategic approach, the regime is applied in an inconsistent and limited manner.⁹⁷ To address the issue, some have proposed an international corps of inspectors, backed up with adequate resources and entitled to prosecute breaches before an international tribunal.⁹⁸ Implementing such an approach in the context of the ATS would require considerable and lengthy negotiation and might not be acceptable to some states. An effective inspection regime for the purposes of biosecurity simply requires AT Parties to cooperate in a more coordinated fashion through the AT Secretariat. If empowered by the ATCM, the AT Secretariat could coordinate regular, systematic inspections by each NAP on all operations issuing advance notice under Article VII(5) of the AT. Frequency could be ascertained depending on the size of operation and capacity of the AT Party and a randomness heuristic included to maintain uncertainty. If implemented effectively, both the deterrent impacts of supervision and regular monitoring regime could be maintained within the context of current operations. The checklist should include a section on biosecurity, incorporating both an examination for the presence of NNS in stations, ships and protected areas and the presence of appropriate mitigation measures, based on the recommendations of the horatory guidance developed through the Biosecurity ICG and SGNNS. All inspectors should also be aware of domestic legislation and note infractions where

⁹⁷ Bastmejer, above n 17, 472-473.

⁹⁸ Bush, above n 79, 38.

relevant. Along with the formal inspection process, supervision could be strengthened by pre-travel education encouraging Antarctic visitors to identify NNS or biosecurity risks, defined by reference to regularly updated and geographic area specific “high risk” promotional material that lists the potential species, activities and areas that pose a biosecurity risk. An electronic reporting form could allow any individual, from station leader to tourist, to report the presence of NNS or biosecurity risks. The form could be submitted to both the SGNNS and the closest station, the latter feeding into a region-specific comprehensive contingency plan. The SGNNS should play a role in examining the biosecurity sections of the inspection reports and reporting forms for relevant gaps and advising resolution of the issue, and coordinating the preparation of the high risk promotional material. An effective inspection regime could also benefit from the EIES system. The template EIES, as discussed above, could provide for the reporting of monitoring processes and specifically include the presence of NNS. Although only a self report measure, the deterrent impact of a potential inspection promotes accuracy. Nevertheless, the marine environment and non-Party activity remain a significant gap in the compliance mechanisms.

As discussed in Chapters Two and Three, the geographic isolation of the Antarctic and the discretion of the port state is a useful barrier that AT Parties can exploit to increase compliance in both AT Party and non-Party operators.⁹⁹ Port state provisions have been discussed in relation to the ATS and international pollution conventions, and in their current state are not utilised for the purposes of reducing the risks of NNS being introduced into the Antarctic area.¹⁰⁰ The potential dimensions of port state control, relevant to biosecurity, could involve the inspection of ships in port for the presence of NNS or biosecurity threats and accreditation for activity in Antarctica. Where any ship does not meet biosecurity requirements, some form of sanction should be employed to limit the potential risk of NNS introduction. There has been considerable focus on the accreditation of tourist vessels and operators;¹⁰¹ an important aspect of environmental protection in the Antarctic area. However, port state control measures should pursue a rigid inspection and accreditation process across all Antarctic actors. The considerable issues surrounding sovereignty of vessels on non-commercial government service should be resolved in the Antarctic area by suspending their

⁹⁹ See for example: ASOC, *Port State Control: An Update on International Law Approaches to Regulate Vessels Engaged in Antarctic Non-Governmental Activities* ATCM XXVI IP 44 (2003); Vicuña, above n 78, 64.

¹⁰⁰ ASOC, *ibid*, 6; c.f. New Zealand suggested “existing multilateral port State control regimes” are sufficient to mitigate the risks of a marine casualty or oil spill; New Zealand, *A Proposal to Enhance Port State Control for Tourist Vessels Departing to Antarctica* ATME Ship Borne Tourism WP 08 (2009).

¹⁰¹ See A D Hemmings, ‘Tourism Accreditation under the Antarctic Treaty’ (Paper given at the Australian Antarctic Tourism Workshop, 23 September 2004).

operation. The AT and PEPAT have complex resolution and arbitration processes that can be invoked where there is a dispute.

AT Parties can implement non-discriminatory biosecurity standards in relation to their own territory without controversy. There is scope for an AT Party to limit access to ports and port services for vessels that do not comply with domestic legislation. However, any such application requires a consistent approach across gateway AT Parties to ensure compliance. Potential ways to implement comprehensive and mandatory port state control will be discussed in relation to the implementation of the biosecurity framework as a whole. A significant limitation of port state control is the financial burden it puts on gateway port states, particularly ports in developing countries.¹⁰² Before enacting any port based biosecurity regime, AT Parties should evaluate the potential costs to port states. Where the costs are deemed prohibitive, parties should look at alternate ways to fund port state control. A voluntary levy imposed by the port on all Antarctic visitors might be appropriate and consistent with the notion that environmental costs of Antarctic activity should be borne by the actors.¹⁰³ In addition, a central fund could be established with differentiated inputs according to capacity with the intention of distributing to those States that share the greatest burden. Alternatively, industry organisations could play a role in paying stipends depending on the profits made in the Antarctic area. This could only be effectively based on a voluntary system but could be supported by the mandatory port state measures. A form of collective Antarctic tax is outside the ambit of this thesis, but worth exploring in the context of port state control.

5.3.3.3. THE INTRODUCER PAYS: APPLYING LIABILITY PROCESSES TO NNS

Dissemination of relevant information reinforced by a rigid and strategic supervision should be sufficient to ensure compliance with biosecurity measures. However, the legal framework should be prepared for intentional and unintentional breaches of primary rules. As a deterrent, the role of withdrawing activity authorization or imposing a fine or imprisonment plays an important role in the domestic implementation of PEPAT.¹⁰⁴ Although PEPAT does not provide for any specific sanctions, it requires States to “modif[y], suspen[d] or cance[l]” activities if they result in impacts inconsistent

¹⁰² E J Molennar, ‘Port State Jurisdiction: Towards Comprehensive, Mandatory and Global Coverage,’ (2007) 38 *Ocean Development and International Law* 1, 247.

¹⁰³ See Section 2.2.3 below; K Arrow, *et al*, ‘Economic growth, carrying capacity, and the environment,’ (1995) 268 *Science* 5210, 520-521.

¹⁰⁴ Bastmeijer, above n 17, 381.

with the planning principles under Article 3.¹⁰⁵ IAATO's bylaws also provide for sanctions for breaching the bylaws.¹⁰⁶ However, the only practical elaboration of sanctions under PEPAT is in relation to liability. The IUCN recommends biosecurity frameworks promote a "culture of accountability and civil and administrative responsibility on all levels."¹⁰⁷

The concept of polluter pays both stimulates greater care on the part of operators to take a precautionary approach to NNS risks and provides for recovery and remediation.¹⁰⁸ However, traditional liability approaches have limited utility for biosecurity.¹⁰⁹ Unauthorised or unintentional introductions are hard to detect, and because of time lags it is often impossible to determine the cause of an introduction with the certainty required by a legal liability regime.¹¹⁰ Moreover, the damage can be unlimited. An approach similar to Annex VI is useful for the Antarctic. The approach would limit liability to cases of environmental emergencies where the source of an introduction is clear and appropriate response measures are taken by another actor or are quantifiable. Such an approach could invoke the provisions of Annex VI by expressly identifying clear NNS introduction and establishment as an "environmental emergency". This would also create a precautionary duty to prepare contingency plans and respond to any identified introduction or establishment in the Antarctic area. A potential solution that avoids the issues of causation and unlimited liability is a no-fault liability fund, financed by a fee collected at the point of entry of the Antarctic area.¹¹¹ Similar to the Annex VI Fund, in the absence of a liable party, the fund could support any response action. Economists have already devised methods to determine the extent of environmental harm from an invasive episode and incorporate the cost into a levy system¹¹² and similar methods have been implemented in the *Australian Ballast Levy Acts*.¹¹³ However, in the context of Antarctica, quantifying potential damages might prove more difficult than a domestic State, where wilderness,

¹⁰⁵ PEPAT, Article 3, 4(b).

¹⁰⁶ IAATO, *IAATO Bylaws*, Article III(h).

¹⁰⁷ Shine, 2000, 81.

¹⁰⁸ Bush, 2000, 39.

¹⁰⁹ Shine, 2000, 34;

¹¹⁰ *Ibid*, 82.

¹¹¹ See for example in relation to NNS generally: M Perrault and W Carroll William, 'Turning off the Tap: A strategy to Address International Aspects of Invasive Alien Species,' (2002) 11(2) *Review of European Community and International Environmental Law* 211.

¹¹² M Margois, J F Shogren and C Fischer, 'How Trade Politics Affect Invasive Species Control', (2005) 52 *Ecological Economics* 305, 310; J Touza, K Dehnen-Schmutz and G Jones, 'Economic Analysis of Invasive Species Policies' in W Nentwig (ed.) 193 *Biological Invasions* (2007), 353.

¹¹³ *Ballast Water Research and Development Funding Levy Act 1998* (Australia) and *Ballast Water Research and Development Funding Levy Collection Act 1998* (Australia); S Riley, 'Invasive Alien Species and the Protection of Biodiversity: the Role of Quarantine Laws in Resolving Inadequacies in the International Legal Regime,' (2005) 17 *Journal of International Law* 3, 358.

aesthetic and scientific values are protected. There is a considerable scope for innovative methods of funding response and port state control.

5.3. ADOPTING A BIOSECURITY FRAMEWORK IN THE ANTARCTIC AREA

There are several different options for the implementation of the various aspects of the ideal biosecurity framework. Many of the approaches discussed above impliedly involve substantial changes to the measures and recommendations underpinning PEPAT and the text of the Annexes themselves. The current approach adopted by the CEP is limited but forms the foundation of the biosecurity framework. The NNS work plan proposes generating objectives and guiding principles, building biosecurity into existing procedures, developing guidance based on a “Prevention, Surveillance and Response” approach and gathering expert advice for high risk areas.¹¹⁴ However, there is no indication how these measures should be implemented in the ATS. There is value in a single framework that can strategically integrate the various elements into a comprehensive system. The IUCN recommends reviewing and consolidating existing measures into a unitary legislative framework that covers all categories of species, areas and activities.¹¹⁵ However, proactively addressing all the risks of biosecurity is a lengthy, complex and technical task and could have the effect of displacing otherwise effective environmental planning mechanisms and institutions.¹¹⁶ This section will promote a unitary framework that incorporates the sectoral approach of the CEP with an end goal of comprehensive, binding measures.

Approaching the issue from a global perspective is a possible alternative to consideration within the ATS. The adoption of a comprehensive instrument addressing biosecurity under the ambit of UNEP, drawing from the example of the IMO in promoting specific regional protection in the Antarctic could have several advantages over the ATS.¹¹⁷ A global negotiation process could include those third party states that authorise activity in the Antarctic and provide for comprehensive compliance procedures across ports and international spaces. However, any negotiation process would be lengthy and potentially involve compromising standards beyond that necessary to protect Antarctic

¹¹⁴ See Table X below and Appendix 6: Report of CEP XXII, Appendix 1: Five Year Work plan for the CEP; Australia, France, New Zealand, ‘A Work Program for CEP Action on NNS’ WP 5/ATCM XXXII (2009).

¹¹⁵ Shine, above n 6 40-41.

¹¹⁶ Ibid, 41.

¹¹⁷ See for example: Riley, above n 113, 334-337; L Glowka and C de Klemm, ‘International Instrument: Processes and Non-indigenous Species Introduction – Is a Protocol Necessary?’ (1996) 247 *Environmental Policy and Law* 240, 247.

values. A regional approach can identify the specific risks in the Antarctic area and the ATS has proven it can address Antarctic environmental issues in a proactive and precautionary way. Moreover, the acceptance of any external control over the Antarctic area is unlikely where territorial claims remained unresolved.¹¹⁸

PEPAT and the AT are flexible framework conventions with inbuilt mechanisms to adapt to new environmental risks and changing patterns of use in the Antarctic area. Adopting a new instrument within the ATS is not necessary as biosecurity implicitly fits within the comprehensive environmental protection of PEPAT. Moreover, biosecurity is a cross cutting issue across the mechanisms of PEPAT. Updating the various tools and mechanisms to incorporate strategic area based planning should be prioritised over the adoption of a single instrument. However, performance obligations for decontamination in the Antarctic and restrictions on discharge require articulation in legally binding form. Adopting annexes or amending Annex II is the most appropriate legal mechanism for implementing a framework of biosecurity measures within the ATS. The key objective, appropriate guiding principles and definitions can be formalised as in the Annex. The appropriate provisions annexed from Article 4, Annex II will be separated into general, unintentional introductions and intentional introductions and the scope widened to incorporate monitoring for establishment. AT Parties will also be obliged to develop contingency plans and respond to identified NNS introductions, based on the approach of Annex VI. The Annex will also formalise the role of the SGNNS and its recommendations, independent of the consideration of the CEP and ATCM. The amendment provisions also permit AT Parties to separately integrate strategic impact assessment that focusses on area based management and strategic inspection processes that are necessary components to the management of biosecurity. Strengthening some aspects of the system, for example amending Annex V to include permit and compliance with management plans, would not involve substantial changes to domestic legislation with some AT Parties already employing the ASMA as a binding tool.¹¹⁹

However, the negotiation history of Annex VI demonstrates the difficulties in establishing an annex to PEPAT, even when there is a clear obligation to do so in the text of PEPAT.¹²⁰ Furthermore, amending an Annex can involve considerable negotiations and compromise of environmental

¹¹⁸ Mansfield and Gilbert, above n 2, 134.

¹¹⁹ For example: United Kingdom, the Netherlands, South Africa and New Zealand; Bastmeijer, above n 17, 460.

¹²⁰ K N Scott, 'Liability for Environmental Damage in Antarctica: Annex VI to the Environmental Protocol on Liability Arising from Emergencies' (2006) 14(3) *Environmental Liability* 87.

values.¹²¹ The amendment of Annex II and preparation of an annex with the objective of comprehensively addressing biosecurity threats in the Antarctic area could prove difficult to negotiate and, if compromised in eventual formulation, may constitute less of a protection than in place under subsidiary measures. PEPAT itself only took one year to negotiate as it effectively integrates the environmental measures already present in the ATS. Analogously, if a number of biosecurity measures are implemented in the ATS already, the Annex only has to integrate these measures into a coordinated instrument.

A combination of measures, recommendations and CMs through CCAMLR should form the initial stages of the regime. Although soft law approaches cannot approximate the level of compliance required for effective biosecurity,¹²² they can play a role in “[serving] a focus for the emergence of a more widespread and consistent body of practice.”¹²³ At the completion of the work of the ICG, a Meeting of Experts should be convened with the role of creating a forward looking framework that has an end goal of a comprehensive, binding Annex. The key objective and guiding principles under consideration could then be then annexed to a resolution that confirms the importance of biosecurity in the AT area and adopts the relevant definitions from the CBD. The initial resolution should also confirm the institution of a subsidiary group on NNS that can guide the development of further measures and recommend more fundamental changes to PEPAT’s environmental management system. An important starting point for the SGNNS is proposing changes to the guidance that have been adopted by the ATCM with a focus on biosecurity. The role of awareness-raising in the ATS is acute and it is essential that the information on how to plan activities consistently imparts a precautionary approach to NNS.¹²⁴ Part of this process will be the adoption of a “quarantine manual” that offers an opportunity for AT Parties sophisticated in biosecurity to share their knowledge and reduce of NNS introduction posed by other AT Parties’ activities. The development of more systematised reporting process can also feed into this process. The limitation of the approach is evident in the regulation of tourism, where resolutions and site guidelines direct tourist activity but do not approximate the strategic, area based management that is necessary to exclude potential introductions. It is thus essential that AT Parties strategically develop binding rules on the implementation of biosecurity standards.

¹²¹ ASOC, *Amendment or Modification of Annex II and the Implications for Further Annex Review* ATCM XXX IP 81 (2007), 5-6.

¹²² Shine, above n 12.

¹²³ P Birnie and A Boyle, *International Law and the Environment* (3rd ed, 2009), 18.

¹²⁴ Potential changes are indicated in *Appendix 7: Building Biosecurity into Existing Resolutions and Procedures*.

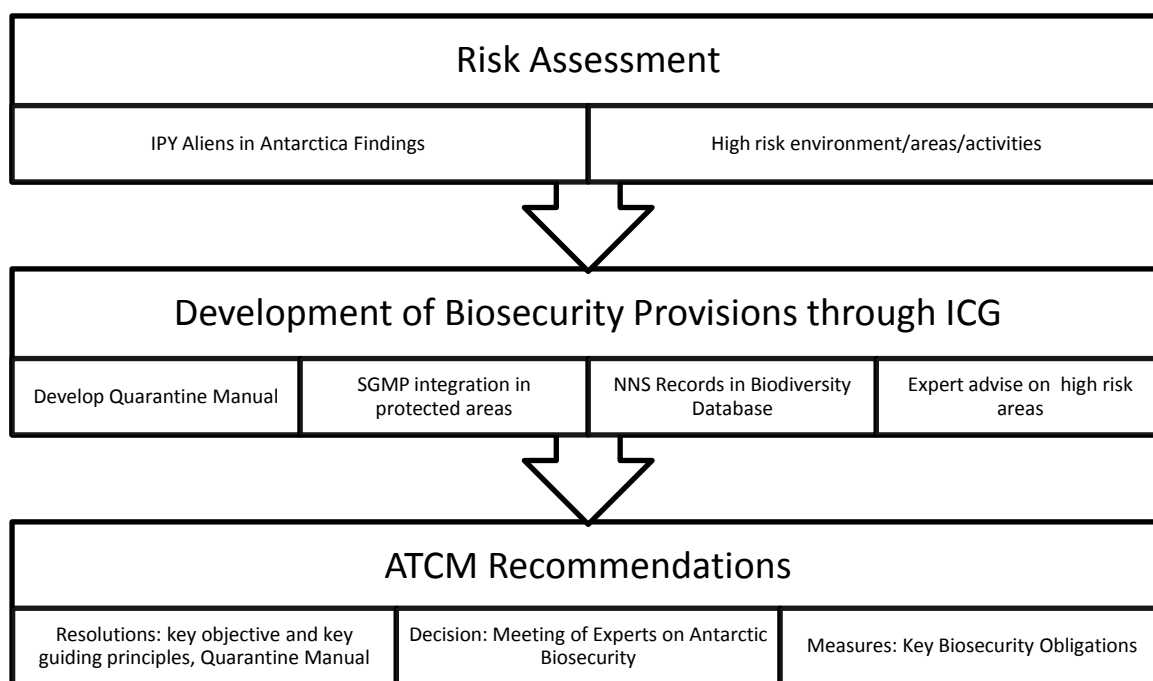


FIGURE 5.8: SUMMARY OF CEP ACTION PLAN ON NNS AND SUGGESTED IMPLEMENTATION¹²⁵

Employing measures has some utility in this process. Measures can create a binding performance obligation, complemented by resolutions annexing guidelines on the means to achieve the obligation.¹²⁶ Although the measure is not quite a Treaty, the negotiation process can be lengthy and involve compromise.¹²⁷ It is important the SGNNS takes an active role in developing attitudes amongst AT Parties that promotes a precautionary and comprehensive approach to biosecurity in the negotiation of new agreements. In particular, the SGNNS should analyse risk assessments performed under the ambit of the ICG and identify performance standards necessary to reduce high risk biosecurity threats. These performance standards can then be implemented as a measure, which could possibly take a significant amount of time to come into force but even before becoming effective, can indicate where the law is going and change AT Parties behaviour. The SGNNS can also utilise the measure to encourage the CEP or a relevant AT Party to enact strategic area protection

¹²⁵ See Ibid for more specific details on the relevant resolutions.

¹²⁶ See for example: tourism and insurance and contingency planning; ATCM, *Insurance and Contingency Planning for Tourism and Non-Governmental Activities in the Antarctic Treaty area* ATCM XXVII Measure 4 (2004) (not yet effective) and ATCM, *Guidelines on contingency planning, insurance and other matters for tourist and non-governmental activities in the Antarctic Treaty area*, ATCM XVII Resolution 4 ATCM (2004).

¹²⁷ See for example, the limitations on landings in Antarctica; (D Haase, M Lamers, and B Amelung; 'Heading into uncharted territory? Exploring the institutional robustness of self-regulation in the Antarctic tourism sector,' (2009) 17 (4) *Journal of Sustainable Tourism*, 411, 428) and review of Annex II: (Australia, *Finalising the Review* ATCM XXXII WP 35 (2000)).

for the purpose of biosecurity. However, the Larsemann Hill ASMA is not an adequate model for future development. Strategic mechanisms for monitoring, planning activity and avoiding biologically sensitive areas should be employed in a comprehensive management plan for all areas where a number of States are operating.

The measure could also be utilised for the introduction of port state measures, including mandatory inspection and sanctions as well as the “no-fault” liability fund or tax invoked by gateway states on visitors. Whether a measure under the ATS to protect the Antarctic environment would be sufficient justification to adopt sanctions is not clear.¹²⁸ A memorandum of understanding (‘MOU’) modelled on the Paris MOU of 1982 or the Viña de Mar MOU of 1992 has been suggested as an appropriate means to implement an effective port state control regime in the Antarctic area.¹²⁹ Vicuña proposes “special certificates of Antarctic worthiness” under such an instrument, which might be an appropriate way to ensure biosecurity-relevant inspections are regularly carried out on AT vessels.¹³⁰ However, further exploration of this issue in the CEP will be useful and the polar code should include mandatory port state responsibilities.¹³¹

There is still a significant role for external standards and collaboration with international regimes outside the ATS for the management of biosecurity in the Antarctic area. The non-application to tourist operators flagged to non-AT Party States will evoke a significant gap in the implementation of any spatial management system by the ATS. High risk areas and aspects of activity in the marine environment are appropriately addressed by the IMO and ATS in unison, as the all States operating in the Antarctic area are members of the IMO.¹³² Assigning marine areas more protection in oceans law invokes the awkward balance between conservation and rational use of Antarctic marine living resources, as well as the limited scope of MPAs in international law.¹³³ However, the designation of the Antarctic Special Area under MARPOL 73/78, adoption of Ballast Water Guidelines for the Antarctic area and the increasing cooperation between the IMO and ATS, increases the potential for

¹²⁸ Vicuña, above n 78, 68.

¹²⁹ ASOC, ‘Port State Control: An Update on International Law Approaches to Regulate Vessels Engaged in Antarctic Non-Governmental Activities’ ATCM XXVI IP 44 (2003), 8; F O Vicuña, ‘Port State Jurisdiction in Antarctica’, in Vidas 2000, 68; E J Molenaar, ‘Port State Jurisdiction: Toward Comprehensive, Mandatory and Global Coverage (2007) 38(1) *Ocean Development and International Law* 225, 245.

¹³⁰ Vicuña, above n 78, 68.

¹³¹ Ibid.

¹³² See *Appendix 8: Treaty Matrix*.

¹³³ See for example: France, *et al*, *Report of the CEP and SC-CAMLR Joint Workshop*, ATCM XXXII WP 55 (2009), [7.7], despite established prioritisation issues and difficulties in providing adequate marine protection SC-CAMLR is established as the lead agency.

the designation of effective marine protected areas.¹³⁴ In marine areas, to target biosecurity threats designation must prohibit access to an area, limit activities in an area or prevent discharge in the area. A Special Area can directly prohibit certain types of pollutants but a PSSA is a basis through which measures may be taken by the IMO.¹³⁵ The protection offered by the IMO includes designation as a Special Area to restrict discharge of pollutants,¹³⁶ adoption of routing and reporting systems¹³⁷ and additional protections with a legal basis, including establishing no-discharge zones for ballast water.¹³⁸ The possibility of developing biofouling guidelines or mandatory procedures to prevent biofouling and ballast water discharge increases the utility of Antarctic PSSAs. The role of the SGNNs in this process is one of promotion, identifying biosecurity threats in the marine environment through both the CEP and SC-CAMLR and encouraging further linkages with the IMO to limit the potential impact of the threat. The potential incorporation of ballast and biofouling measures into the Mandatory Polar Code should be contemplated.

Moreover, collaboration with the CBD and area protection regimes promotes transparent and integrated approaches to biosecurity in area protection. Tourist activities pose particular risks to certain areas and restricting tourist activities to specific areas in the terrestrial and marine environment could limit the potential for NNS introduction. The potential designation of areas under other conventions could encourage non-AT Party compliance and harmonise Antarctic management better with global biodiversity protection conventions. In the terrestrial environment, this is very difficult. There is no scope in the Ramsar Convention, World Heritage Convention or the Man and the Biosphere Program for protecting areas outside of national jurisdiction.¹³⁹ Article 8(h) of the CBD does apply outside national jurisdiction and part of its program of work promotes the development of guidance, best practices and pilot projects that address the threats of invasive alien species to particular sites or habitats protected under the above Conventions. In order to create some scope for Antarctic designation, AT Parties need to empower the AT Secretariat to interact with area protection regimes on behalf of AT Parties. Moreover, AT Parties must ensure the ratification of the

¹³⁴ *Chairs Report of the ATME on the Management of Ship-Borne Tourism in the Antarctic Treaty Area* (2009), 30, [Recommendation 16].

¹³⁵ A Gillespie, 'Defining Internationally Protected Areas', (2009) *Journal of International Wildlife Law and Policy*, 12: 4, n 7.

¹³⁶ The entire Antarctic area is a Special Area under Annexes I and II; See below, Section 2.1.4.

¹³⁷ Routing and reporting systems are only likely to apply to IMO Safety Conventions, restrictions on navigation are not usually deemed appropriate in the context of the customary freedom of navigation guaranteed by UNCLOS, Article 87(1), see below Section 2.1.4; although some parties have used the designation to route ships around particularly environmentally sensitive areas that have some safety implications, see Gillespie, above n 135, n 7.

¹³⁸ Given the BWM Convention comes into force: Article 2(3) of the Convention permits states to adopt more stringent measures than those stipulated under the Convention.

¹³⁹ See Chapter 3, Section 3.2.1.2.

relevant Conventions and promote the creation of mechanisms for protection of international spaces. It is unlikely any such measures will be promoted while the sovereign status of Antarctica remains ambiguous. However, interaction with the CBD on the protection of special areas, if only to provide key studies of ASPAs designated for ecological significance, will do much to increase the legitimacy of the ATS amongst non-State Parties. The SGNNS is the most appropriate support agency for such an interaction. Moreover, AT Parties regulation has thus far focussed on the potential risks from intensity of visitation but just as threatening is the scope of tourist activities. Systematised limitation of tourist activity to areas that can be regularly monitored is important and the development of adequate regulatory standards in collaboration with IAATO should be a focus of AT Parties.

Although the establishment of commitments in legally binding form must be the outcome of the development of a biosecurity framework in the Antarctic, the effectiveness of biosecurity will be contingent upon the development of attitudes towards the issue. Constant vigilance is necessary for a regime to be effective, integrating the changing patterns of use and climate into the constantly developing field of international biosecurity. Through the establishment of a permanent expert body under the CEP, making recommendations and developing best practice guidelines, AT Parties can collectively contribute to the incremental development of a biosecurity framework that can take into account these developments. This body, as envisioned in this chapter, should be responsible for a strategic focus on biosecurity that must integrate the global, regional and domestic developments into a cohesive and consistent set of practices that can once sufficiently accepted can be codified in the form of an Annex. A series of resolutions editing the current guidance, formalising the objectives, institution and guidance should form the foundations of the framework. Where more radical developments are deemed necessary through the analysis of risks, measures that incorporate biosecurity performance standards and strategic inspection processes should be implemented and Annexes amended to incorporate a strategic, area based management system into PEPAT.

5.4. CONCLUDING THOUGHTS

“He looked out at the great blank of a Polar continent, the wide white page upon which he would write a new civilization...”¹⁴⁰

“Man is by definition the first and primary weed under whose influence all other weeds have evolved.”¹⁴¹

Since whalers and sealers plundered the Southern seas and islands and early explorers sought immortality in achieving milestones, the Antarctic area’s isolation has been its attraction. A visit to the sprawling town of McMurdo will dispel any illusion that Antarctica is the “bare canvas” imagined by artists. However, it is the absence of one of the most obvious symptoms of human presence, invasive NNS, that still offers significant value to commercial operators and scientists alike. To avoid apocalyptic homogeneity predicted for other regions,¹⁴² safeguarding the wilderness aspects of the Antarctic environment necessitates radical action by AT Parties to minimize or eliminate the risk of human activity introducing NNS.

In every wilderness area protected by legal processes, there is a balance between human utility and environmental protection. These risks are epitomized and amplified by NNS fundamentally attached to all human movement. A growing knowledge base has begun to explore the extent Antarctic operations introduce NNS. Increasing research indicates that NNS can survive and have established in some Antarctic environments. Some of those likely to visit Antarctica are the same individuals likely to visit other high altitude or latitude locations, whether they be ecotourists, scientists or vessels and thus have the potential to pick up potentially viable NNS and accidentally dispose propagules into the Antarctic area. Moreover, the climactic isolation that protects the Antarctic is slowly disappearing and as geologically contiguous areas become suited for NNS dispersal, the potential for human impacts will increase. PEPAT introduces a focus on minimizing environmental impact in the Antarctic, primarily through introducing awareness processes in the management of NAPs and compliance through mutual inspection and consultation. This stops short of “the very best

¹⁴⁰ B Cunningham, *Wide White Page* (1936) cited in B Manhire (ed.) *The Wide White Page* (2004), 20.

¹⁴¹ J R Harlan, ‘Crops and Man’ (1992) cited in J Kallas, *Edible Wild Plants: Wild Foods from Dirt to Plate* (1997), 2.

¹⁴² S M Meyer, *The End of the Wild* (2006), 4-5.

efforts of the ATCPs to protect the Antarctic environment”¹⁴³ and the lack of legal mechanisms to address the vectors of NNS introduction is a serious gap that requires attention.

The final chapter proposes some proactive measures to exclude NNS that include but surpass mandatory quarantine standards. Precautionary, holistic, area based and strategic planning processes must be introduced into the Antarctic area, with independent supervision and enforcement measures adopted to ensure compliance. A fundamental revision of the concept of precaution as applied to Antarctica is necessary to achieve the level of protection needed. The concept of sustainable use, whether for research purposes, aesthetic pleasure or marine living resources, needs to be revised, prioritizing conservation of indigenous ecosystems. Planning processes must be developed that do not focus on individual State programs but holistically on human interaction with the continent. Large, representative areas should be put aside for higher protection in the terrestrial and marine environment. Analogous to the New Zealand Sub-Antarctic Minimum Impact Islands, visitation to any protected area should be justified on the basis of management purposes. Moreover, any human presence should fit within a strategic plan for interaction with the continent that includes a focus on biosecurity. To implement these approaches, an international institution equipped with legal personality, the capacity to inspect all actors and take sanctions against States who do not comply should be created. To essentially revise the ATS is an ambitious goal and would require a considerable amount of work within the international community and ATS, however, the changes are necessary to effectively protect the Antarctic from the threats associated with NNS.

The flexibility of the ATS has often been cited as the heart of its success.¹⁴⁴ To actually put into effect the change in focus from peaceful, scientific use to comprehensive protection of the Antarctic environment, that adaptability must be further tested. In the year 2010, looking back at the list of NNS packed on the voyage on Captain Robert Falcoln Scott’s final, fatal attempt on the Pole is staggering. Recounted in Anne Michael’s *Ice House*: the “thirty five-dogs...fifteen ponies, one guinea pig, one fantail pigeon, three rabbits and one cat with its own hammock, blanket and pillow”¹⁴⁵ do not begin to describe the propagule load that early explorers and scientists brought to the

¹⁴³ D Rothwell and R Davis, *Antarctic environmental protection: a collection of Australian and international instruments* (1997), 39.

¹⁴⁴ B Njåstad, ‘Protocol on Environmental Protection to the Antarctic Treaty’ in B. Riffenburgh (ed.), *Encyclopedia of the Antarctic* (2007), 783; E F Foreman, ‘Protecting the Antarctic Environment: Will a Protocol be Enough?’ (1991-1992) 7 *American University Journal for International Law* 843, 858; K Suter, *Antarctica: private property or public heritage* (1991), 22.

¹⁴⁵ A Michaels, *Ice House* in B Manhire (ed.) *The Wide White Page* (2004), 167-170.

continent.¹⁴⁶ Fortunately, the climactic isolation has somewhat protected the Antarctic area but the same cannot be said for the many other areas of the planet where the careless and naïve introduction of NNS has fundamentally changed the balance of ecosystems.¹⁴⁷ It is to be hoped in a hundred years time, the future generations that will benefit from the protection of areas like Antarctica do not equally bemoan our lack of foresight. The most damaging NNS will always be the human and although eradication is not an option, the priority of those wishing to protect Antarctica for future generations should be on containment and control.

¹⁴⁶ See for example: R L Farrell, *et al*, 'Scientific evaluation of deterioration of historic huts of Ross Island, Antarctica' in S Barr and P Chaplin (eds.) *Historical Polar Bases – Preservation and Management* (2008).

¹⁴⁷ A useful selection of ecosystem effects can be found in: M Clout and M De Poorter, 'Invasive Alien Species: Global Lessons and Antarctic Implications' in M Rogan-Finnemore, *Non-native species in the Antarctic Proceedings* (2006), 3-19.

BIBLIOGRAPHY

1. ARTICLES/BOOKS/REPORTS

- ACAP, *Report of ACAP Meeting of the Parties II* (2006)
- AFMA and DEWHA, *Guide to CCAMLR New and Exploratory Fisheries* (2009)
<http://www.afma.gov.au/fisheries/antarctic/ccamlr/publications/cclamr_guide_2009.pdf> at 3 October 2009
- Agnew, D. J., 'The illegal and unregulated fishery for toothfish in the Southern Ocean and the CCAMLR catch documentation scheme,' (2000) 24 *Marine Policy* 366
- Alder, J., S. Cullis-Suzuki, V. Karpouzi, K. Kashner, S. Moudoux, W. Swartz, P. Trujillo, R. Watson, and D. Pauly, 'Aggregate performance in managing marine ecosystems of 53 maritime countries' (2009) 34(3) *Marine Policy* 468
- Allen, C. H., 'Protecting the Oceanic Gardens of Eden: International Law Issues in Deep-Sea Vent Resource Conservation and Management,' (2001) 13 *Georgetown International Law Review* 563
- Anton, D. K., 'Australian Jurisdiction and Whales in Antarctica: Why the Australian Whale Sanctuary in Antarctic Waters Does Not Pass International Legal Muster and is also a Bad Idea as Applied to Non-Nationals,' (2008) 11 (3-4) *Asia Pacific Journal of International Law* 171
- ANZ, ANZ Annual Report 2007/2008 (2008)
<http://www.antarcticanz.govt.nz/images/downloads/annualreport/annualreport_2008lr.pdf> at 3 May 2010
- Aplet, G., J. Thomson, and M. Wilbert, 'Indicators of Wildness: Using Attributes of the Land to Assess the Context of Wilderness' in S. F. McCool, D. N. Cole, W. T. Borrie, J. OLoughlin, (2000) 2 *Wilderness science in a time of change conference Volume 2: Wilderness within the context of larger systems, Proceedings RMRS-P-15-VOL-2*
- Aquenal Pty Ltd., *A yacht enclosure system to mitigate biosecurity risks associated with biofouling* MAFBNZ Technical Paper No 2009/41 (2009)
- Argentina, *Procedures of Environmental Assessment (Annex I of the Madrid Protocol)* ATCM XXII WP 14 (1999)
- Arrow, K., B. Bolin, R. Costanza, P. Dasgupta, C. Folke, and C. S. Holling, 'Economic growth, carrying capacity, and the environment,' (1995) 268 *Science* 5210
- ASOC, *Amendment or Modification of Annex II and the Implications for Further Annex Review* ATCM XXX IP 81 (2007)
- ASOC, *Antarctic ship-borne tourism: Perspectives on Shipping Management* ATME on Ship Borne Tourism IP X (2009)
- ASOC, *Designation of Marine Protected Areas within the Antarctic Treaty Area* ATCM XXXI IP 119 (2008)
- ASOC, *Impacts of local human activities on the Antarctic environment: a review* ATCM XXXII IP 2 (2009)
- ASOC, *Managing Antarctic Tourism: A Critical Review of Site-Specific Guidelines* ATCM XXX IP 65 (2006)
- ASOC, *Marine Protected Areas – Steps Forward for the ATCM* ATCMXXX IP 87 (2007)
- ASOC, *Marine Protected Areas in the Antarctic* ATCM XXXII IP 41 (2009)
- ASOC, *Port State Control: An Update on International Law Approaches to Regulate Vessels Engaged in Antarctic Non-Governmental Activities* ATCM XXVI IP 44 (2003)
- ASOC, *Strategic Issues posed by Commercial Tourism in the Antarctic Treaty Area* ATCM XXIX IP 120 (2006)
- ASOC, *The Case for Strengthening the Mechanisms for Conducting Inspections under the Protocol* ATCM XVIII IP 95 (1994)
- ASOC, *The use of Port State measures to improve fisheries compliance at the international level: Issues and instruments – the CCAMLR case* CCAMLR XXV/BG/29 (2006)
- ASOC, *Tourism and Land-based Facilities in Antarctica* ATCM XXXII IP 23 rev. (2009)
- ASOC, *Tourism and the duty for ATCP Action* ATCM XXX IP 85 (2007)
- ASOC, *What does Regulation of Commercial Tourism mean? ATME on Tourism and Non-Governmental Activities in Antarctica* IP 20 (2004)
- ASOC, *Working Towards a Polar Vessel Code* ATCM XXXIII IP 68 (2010)
- ASOC, *Worst Case Scenario* IP 81 ATCM XXV (2002)

AT Secretariat, *Electronic Information Exchange System: A report on the first operational season* ATCM XXXII SP 8 (2009)

AT Secretariat, *Topic Summary of CEP discussions on Non-native species (NNS) in Antarctica* ATCM XXXII SP11 (2009)

AT Secretariat, *Topic Summary of CEP discussions on Non-native species*, ATCM XXXII, SP 11 (2009).

ATCM, *Final Meeting of the SATCM X Meeting* (1990)

ATCM, *Final Meeting of the SATCM XI-1 Meeting* (1991)

ATCM, *Final Meeting of the SATCM XI-2 Meeting* (1991)

ATCM, *Final Meeting of the SATCM XI-3 Meeting* (1991)

ATCM, *Final Meeting of the SATCM XI-4 Meeting* (1991)

ATCM, *Final Report of the ATCM I Meeting* (1959)

ATCM, *Final Report of the ATCM II Meeting* (1961)

ATCM, *Final Report of the ATCM III Meeting* (1964)

ATCM, *Final Report of the ATCM XII Meeting* (1983)

ATCM, *Final Report of the ATCM XIX Meeting* (1995)

ATCM, *Final Report of the ATCM XVII Meeting* (1994)

ATCM, *Final Report of the ATCM XVIII Meeting* (1994)

ATCM, *Final Report of the ATCM XX Meeting* (1996)

ATCM, *Final Report of the ATCM XXII Meeting* (1997)

ATCM, *Final Report of the ATCM XXII Meeting* (1998)

ATCM, *Final Report of the ATCM XXIII Meeting* (1999)

ATCM, *Final Report of the ATCM XXIV Meeting* (2001)

ATCM, *Final Report of the ATCM XXIX Meeting* (2006)

ATCM, *Final Report of the ATCM XXV Meeting* (2002)

ATCM, *Final Report of the ATCM XXVI Meeting* (2003)

ATCM, *Final Report of the ATCM XXVII Meeting* (2004)

ATCM, *Final Report of the ATCM XXVIII Meeting* (2005)

ATCM, *Final Report of the ATCM XXX Meeting* (2007)

ATCM, *Final Report of the ATCM XXXI Meeting* (2008)

ATCM, *Final Report of the ATCM XXXII Meeting* (2009)

ATCM, *Final Report of the VIII ATCM* (1975)

ATME, *Chair's Report of Antarctic Treaty Meeting of Experts on Ship Borne Tourism in the Antarctic Treaty Area* (2009)

ATME, *Guidelines for Antarctic Shipping and Related Activities 17-19 April 2000* (2000)

Australia and SCAR, *Aliens in Antarctica* ATCM XXX, IP 49 (2007).

Australia, *Annex II: Finalising the Review* ATCM XXII WP 39 (2009)

Australia, *Antarctic Alien Species Database* ATCM XXXI WP 16 (2008).

Australia, *Australia's Antarctic Quarantine Practices* ATCM XXVII, IP 71 (2004).

Australia, *Australia's Fourth National Report to the United Nations Convention on Biological Diversity* (2009) <
<http://www.cbd.int/doc/world/au/au-nr-04-en.pdf>> at 29 April 2009

Australia, Belgium, France and Italy, *Indicative Draft of a Convention for the Comprehensive Protection of the Antarctic Environment* SATCM XI-1 doc. XI (1990).

Australia, China, India, Romania and Russian Federation, *Measures to protect Larsemann Hills, East Antarctica, from the introduction of NNS*, ATCM XXXI IP 17 (2008)

Australia, China, Romania and Russian Federation, *Management Plan for the Larsemann Hills ASMA* ATCM XXIX WP 08 (2008).

Australia, *Diseases of Antarctic Wildlife* SATCM XII WP 6 (2000).

Australia, *Draft Response Plan in the Event that Unusual Animal Deaths are Discovered* ATCM XXV IP 62 (2002).

Australia, *Environmental Impact Assessment – the Role of EIA Guidelines in Understanding “Minor” or “Transitory”* ATCM XXII WP 19 (1999)

Australia, *Finalising the Review* ATCM XXXII WP 35 (2000)

Australia, France and New Zealand, *A work program for CEP action on NNS* ATCM XXXII WP 05 (2009).

Australia, *Introduction of Disease into Antarctic Birds* ATCM XXI IP 51 (1997)

Australia, *Introduction of Diseases to Antarctic Wildlife: Proposed Workshop* ATCM XXII IP 4 (1998).

Australia, *Measures to address the unintentional introduction of non-native biota and disease to the Antarctic Treaty Area*, ATCM XXVIII WP 28 (2005)

Australia, *National Strategy for the Conservation of Australia's Biodiversity* (1996)
 <<http://www.environment.gov.au/biodiversity/publications/strategy/pubs/national-strategy-96.pdf>> at 19 October 2009

Australia, Peru and United Kingdom, *Report of Joint Inspections Under Article VII Of The Antarctic Treaty And Article 14 of the Environmental Protocol* ATCM XXIX WP 34(2005)

Australia, *Principles underpinning Australia's approach to Antarctic quarantine management* ATCM XXIX IP 44 (2006)

Australia, *Report on the open-ended intersessional contact group on Diseases of Antarctic Wildlife: Report 1: Review and Risk Assessment* ATCM XXIV WP 10 (2001).

Australia, *Report on the open-ended intersessional contact group on Diseases of Antarctic Wildlife: Report 2: Practical Measures to Diminish Risk Draft* ATCM XXIV WP 11 (2001).

Australia, *Report to ATCM XXIII on outcomes from the Workshop on Diseases of Antarctic Wildlife* ATCM XXIII WP 32 (1999).

Australia, *Scott Base and McMurdo Station: Report of an inspection under Article VII of the Antarctic Treaty and Article 14 of the Protocol on Environmental Protection* ATCM XXVIII WP 16 (2005)

Australia, *The Australian Antarctic Division's Environmental Management System* ATCM XXV IP 56 (2002)

Australian Government's Cooperative Research Centres Program for Sustainable Tourism Pty Ltd, *Australian Antarctic and Sub Antarctic Tourism: Towards a Sustainable Industry* (2009)

Australian Shipowner's Association, *Assessment of Introduced Marine Pest Risks Associated with Niche Areas in Commercial Fishing*, Final Report (Jan 2007)
 <http://www.asa.com.au/Final%20Report%20on%20the%20Commercial%20Vessels%20Biofouling%20Project_with%20images.pdf> at 4 November 2009

Australian Shipowner's Association, *Assessment of Introduced Marine Pest Risks Associated with Niche Areas in Commercial Fishing*, Final Report (2007),
 <http://www.asa.com.au/Final%20Report%20on%20the%20Commercial%20Vessels%20Biofouling%20Project_with%20images.pdf> at 4 November 2009

B Cunningham, *Wide White Page* (1936)

Baird, R., 'The Antarctic Treaty system and Japan's scientific whaling in the Southern Ocean – is there an obligation to protect the Antarctic marine ecosystem?' (2008) 11 (3-4) *Asia Pacific Journal of Environmental Law* 193

Baird, R., 'They Said They'd Never Win: Humane Society International Inc v Kyodo Senpaku Kaisha Ltd' (2008) (3-4) *Asia Pacific Journal of Environmental Law* 11

Barnes, D. K. A., and Fraser, K. P. P., 'Rafting by five phyla on man-made flotsam in the Southern Ocean, 262 *Marine Ecology Progress Series* 282.

Baslar, K., *The concept of the common heritage of mankind in international law* (1998).

Bastmeijer, K., 'Implementing the Antarctic Environmental Protocol: Supervision of Antarctic activities', (2003) 11 *Tilburg Foreign Law Review* 1

Bastmeijer, K., 'Implementing the Environmental Protocol Domestically: An Overview', in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)

Bastmeijer, K., 'Managing Human Activities in Antarctica: Should Wilderness Protection Count?' (2005) 13 *Marine Ecology Progress Series* 335

Bastmeijer, K., and R. Roura, 'Environmental Impact Assessment in Antarctica', in K Bastmeijer and Koivurova T (eds.) *Theory and Practise of Transboundary Environmental Impact Assessment* (2008)

Bastmeijer, K., and R. Roura, 'Regulating Antarctic Tourism and the Precautionary Principle,' (2004) 98(4) *American Journal of International Law* 781

Bastmeijer, K., *The Antarctic Environmental Protocol and its Domestic Legal Implementation* (2003)

Beale, R., J. Fairbrother, A. Inglis, and D. Trebek, *One Biosecurity: A Working Partnership: The Independent Review of Australia's Quarantine and Biosecurity Arrangements Report to the Australian Government* (2008) <http://www.daff.gov.au/_media/documents/about/beale/intro-exec-sum-rec.pdf> at 10 March 2010

Beck, P. J., 'Managing Antarctic Tourism: A Front-Burner Issue,' (1994) 21(2) *Annals of Tourism Research* 382

Beck, P. J., 'The United Nations and Antarctica, 2005: the end of the 'Question of Antarctica'?' (2006) 42(3) *Polar Record* 217

Beck, P. J., 'Twenty years on: the UN and the 'Question of Antarctica' 1983-2003' (2004) 40(3) *Polar Record* 205

Beck, P. J., *A Continent in Search for a Sovereign* (1984)

Beck, P. J., *The International Politics of Antarctica* (1986)

- Bederman, D. J., and S. P. Keskar, 'Antarctic Environmental Liability: the Stockholm Annex and Beyond' (2005) 19 *Emory International Law Journal* 1383
- Belgium and France, *Joint Inspection in Eastern Antarctica conducted in 1999 by Belgium and France under Article VII of the Antarctic Treaty* ATCM XXIII IP 42 (1999)
- Bergin, A., and M. Haward, 'Japan's Distant Water Tuna Fisheries: Retrospect and Prospect,' (1990) 4 *Antarctic Southern Ocean Law and Policy Occasional Papers* 1
- Bergstrom D M and Selkirk P M, 'Human Impacts on Sub-Antarctic Terrestrial Environments,' (2007) 141 *Papers and Proceedings of the Royal Society of Tasmania* 1
- Berguño, J., 'Institutional Issues for the Antarctic Treaty System with the Protocol in Force: An Overview' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- Berstorm, D., A. Lucieer, K. Kiefer, J. Wasley, L. Belbin, T. K. Pederson, and S. L. Chown, 'Indirect effects of invasive species removal devastate World Heritage Island,' (2009) 46 *Journal of Applied Ecology* 73
- Bertram, E., 'Antarctic Ship-borne Tourism: an Expanding Industry,' in J. M. Snyder, and B. Stonehouse, (eds.) *Prospects for Polar Tourism* (2007)
- Bertram, E., and B. Stonehouse, 'Tourism Management for Antarctica' in J. M. Snyder, and B. Stonehouse, (eds.) *Prospects for Polar Tourism* (2007)
- Bilderbeek, S., A. Wigerde, and N. van Schaik (eds.), *Biodiversity and International Law: the Effectiveness of International Environmental Law*, Report of the Global Consultation on the Development and Enforcement of International Law with a Special Focus on the Preservation of Biodiversity and the International Law Conference (1992)
- Binder, G., 'The Dialectic of Duplicity: Treaty Conflict and Political Contradiction', (1985) 34 *Buffalo Law Review* 340
- Birnie, P. W., and A. E. Boyle, *International law and the environment* (1st ed, 1992)
- Birnie, P. W., and A. E. Boyle, *International law and the environment* (3rd ed, 2009)
- Bloom, E. T., Introductory Note to Antarctic Treaty Environmental Protocol Liability, (2006) 45 *International Legal Materials* 1
- Bohlander, J., Review of options for in-water cleaning of ships, MAFBNZ Technical Paper 2009/42 (2009)
- Bowditch, N., 'The American Practical Navigator: An Epitome of Navigation,' (1995) *National Ocean Service, Pub.* No 9
- Bowman, M. J., 'International Treaties and the Global Protection of Birds: Part II,' (1999) 11(2) *Journal of Environmental Law* 281.
- Bright, C., *Life Out of Bounds: Bioinvasion in a Borderless World* (2000)
- Broady, P.A. and R.A. Smith, 'A preliminary investigation of the diversity, survivability and dispersal of algae introduced into Antarctica by human activity.' (1994) *Proceedings of the NIPR Symposium on Polar Biology* 7
- Brown, A., 'Some Current Issues Facing the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR)' in G. Triggs, and A. Riddell, *Prospects for Polar Tourism* (2007)
- Brownlie, I., *Principles of public international law* (2008)
- Bruce, M., 'Epilogue', in J. Verhoeven, P. Sands and M. Bruce (eds.), *The Antarctic Environment and International Law* (1992)
- Brunner, S., 'Article 10 of the Antarctic Treaty Revisited' in F. Francioni and T. Scovazzi, *International law for Antarctica* (1996)
- Buck, S. J., *The global commons: an introduction* (1998)
- Burrowes, J., Y. Klaessens, and D. Appels, 'Just Cruising? Environmental effects of cruise ships' Report of the Parliamentary Commissioner for the Environment (2003)
- Bush W. M., *Antarctica and international law: a collection of interstate national documents* (1982)
- Bush W. M., *Antarctica and international law: a collection of interstate national documents* (1992)
- Bush, W. M., 'Means and Methods of Implementation of Antarctic Environmental Regimes and National Environmental Instruments: An Exercise', in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- Bush, W. M., 'Australian Implementation of the Environmental Protocol' in in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- Bush, W. M., 'Means and Methods of Implementation of Antarctic Environmental Regimes and National Environmental Instruments: An Exercise in Comparison' in J. Verhoeven, P. Sands and M. Bruce (eds.) *The Antarctic Environment and International Law* (2000), 38
- Bush, W. M., 'The Antarctic Treaty System: A Framework for Evolution' in R. A. Herr, H. R. Hall and M. G. Haward (eds.), *Antarctica's Future: Continuity or Change* (1990)

- Carlton, J., 'Transoceanic and Interoceanic Dispersal of Coastal Marine Organisms: The Biology of Ballast Water' (1985) 23 *Oceanography and Marine Biology Annual Review* 313-71
- Carvalho, M. L., and P. Jullio, 'Implementation of the Antarctic Environmental Protocol by Chile: History, Legislation and Practice' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- CBD Executive Secretary, *Indepth Review of Invasive Alien Species* UNEP/CBD/COP/9/INF/32 (2008)
- CBD Executive Secretary, *Reporting Mechanisms under the Convention and Other Conventions* (2005) UNEP/CBD/WG-RI/1/10
- CBD Executive Secretary, *Scientific and Technical Cooperation and the Clearing House Mechanism: Proposals for the implementation of the strategic plan of the clearing house mechanism* (2008) UNEP/CBD/COP/9/23
- CBD Executive Secretary, *Voluntary Guidelines on Biodiversity-Inclusive Impact Assessment* UNEP/CBD/COP/8/27/Add.2 (2006)
- CCAMLR Review Panel, *CCAMLR Performance Review Report* (2008) < <http://www.ccamlr.org/pu/E/e-Prfrm%20Review%20Report%20Jun09.pdf>> at 19 September 2009
- CCAMLR, 'Report of the Workshop for the Development of a Compliance Evaluation Procedure' in Report of the XXVIII CCAMLR Meeting, Annex 6 (2009)
- CCAMLR, 'Report of the Workshop on Vulnerable Marine Ecosystems' in Report of SC-CAMLR XXVIII, Annex 10 (2009)
- CCAMLR, CCAMLR's Management of the Antarctic (2001) <http://www.ccamlr.org/pu/e/e_pubs/am/man-ant/synopsis_final_all.pdf>, accessed 10 April 2010
- CCAMLR, *Procedure for according protection to CEMP sites* CM 91-01 (2004)
- CCAMLR, *Report of the XXV CCAMLR Meeting* (2006)
- CCAMLR, *Report of the XXVI CCAMLR Meeting* (2007)
- CCAMLR, *Report of the XXVI SC-CAMLR Meeting* (2007)
- CCAMLR, *Report of the XXVII CCAMLR Meeting* (2008)
- CCAMLR, *Report of the XXVIII CCAMLR Meeting* (2009)
- CEP, 'CEP Advise to ATCM XXVI on the Draft CEE Contained in ATCM XXVI/WP01', Report of CEP IV (2003), Appendix 1.
- CEP, *Report of the CEP I Meeting* (1998)
- CEP, *Report of the CEP II Meeting* (1999)
- CEP, *Report of the CEP III Meeting* (2000)
- CEP, *Report of the CEP IV Meeting* (2001)
- CEP, *Report of the CEP IX Meeting* (2006)
- CEP, *Report of the CEP V Meeting* (2002)
- CEP, *Report of the CEP VI Meeting* (2003)
- CEP, *Report of the CEP VII Meeting* (2004)
- CEP, *Report of the CEP VIII Meeting* (2005)
- CEP, *Report of the CEP X Meeting* (2007)
- CEP, *Report of the CEP XI Meeting* (2008)
- CEP, *Report of the CEP XII Meeting* (2009)
- Cessford, G. R., 'Antarctic Tourism: A Frontier for Wilderness Management' (1997) 3(3) *International Journal of Wilderness* 7
- Charney, J I, 'The Antarctic System and Customary International Law' in F. Francioni and T. Scovazzi, *International law for Antarctica* (1996)
- Charney, J. I., 'The Antarctic System and Customary International Law', in F. Francioni, and T. Scovazzi, *International Law for Antarctica* (2nd ed, 1996)
- Chile, *Relation between the Protocol on Environmental Protection to the Antarctic Treaty and Other International Agreements of A Global and Regional Scope* ATCM XIX WP 20 (1995).
- Chopra, S. K., 'Antarctica as a Commons Regime: A Conceptual Framework for Cooperation and Coexistence,' in C. C. Joyer and S. K. Chopra, (eds.), *The Antarctic Legal Regime* (1988)
- Chown, S. L., A. S. L. Rodrigues, N. J. M. Gremmen and K. J. Gaston, 'World Heritage status and conservation of Southern Ocean islands, 15 *Conservation Biology* 550.
- Clark, M. R. and P. R. Dingwall, *Conservation of Islands in the Southern Ocean* (1990)
- Clayton, M. N., C. Wiencke and H Klöser, 'New records and sub-Antarctic marine benthic macroalgae from Antarctic,' (1997) 17 *Polar Biology* 141

- Clayton, M. N., C. Wiencke, and H. Klöser, 'New records and sub-Antarctic marine benthic macroalgae from Antarctic,' (1997) 17(2) *Polar Biology* 141
- Clout, M. and M. D. Poorter, 'Invasive Alien Species: Global Lessons and Antarctic Implications' in M. Rogan-Finnemore (ed.), *Non-Native Species in the Antarctic Proceedings* (2008)
- Codling, R., 'Wilderness and aesthetic values in the Antarctic' (2001) 37 *Polar Record* 337
- Codling, R., 'Wilderness and aesthetic values of Antarctica,' (2001) 7 *Polar Record* 37
- Cohen, E., *Handbook of the Antarctic Treaty System* (8th ed, 2002)
- Colautti R. I., and H. J. MacIsaac, 'A neutral terminology to define 'invasive' species' (2004) 10 *Diversity and Distributions* 135
- Colella, A., 'The Legal Nature of Antarctic Recommendations and their Implementation in Domestic Legal Systems' in F Francioni (ed.) *International Environmental Law for Antarctica* (1992)
- COMNAP and IAATO, *The use of Ballast Water in Antarctica* ATCM XXVIII, IP 121 (2005)
- COMNAP, *Survey on existing procedures concerning introduction of NNS in Antarctica* ATCM XXXI IP 98 (2008)
- COMNAP, *The Use of Anti-fouling Biocide Paints by national Antarctic Program Vessels* ATCM XXIX IP 82 (2006).
- Connor, M. A., 'Wastewater treatment in Antarctica,' (2008) 44 *Polar Record* 165
- Constable, A. J., W. K. de la Mare, D. J. Agnew, I. Everson, and D. Miller, 'Managing fisheries to conserve the marine ecosystem: practical implementation of the Convention on the Conservation of Antarctic Marine Living Resources' (2000) 57(3) *ICES Journal of Marine Science* 778
- Considine, M. L., 'Politics adds to Macquarie Island's pest problem', (2007) 136 *ECOS* 20
- Convey P., Y. Frenot, N. Gremmen, and D. M. Bergstrom, 'Biological Invasions' in D. M. Bergstrom, P. Convey and H. L. Huiskes (eds), *Trends in Antarctic Terrestrial and Limnetic Ecosystems* (2006)
- Convey, P., 'Non-native species in Antarctic Terrestrial and Freshwater Environments: Presence, Sources, Impacts and Predictions,' in M. Rogan-Finnemore (ed.), *Non-Native Species in the Antarctic Proceedings* (2008)
- Convey, P., 'The influence of environmental characteristics on the life history attributes of Antarctic terrestrial biota', (1996) 71 *Biological Reviews* 191
- Cooke J., and M. Earle, 'Towards a precautionary approach to fisheries management,' (1993) *Review of European Community and International Environmental Law* 252
- Cordonnery, L., 'Environmental Protection in Antarctica: Drawing Lessons from the CCAMLR Model for the Implementation of the Madrid Protocol, (1998) 19 *Ocean Development and International Law* 136
- Costa Rica, *Cetaceans and Other Marine Biodiversity of the Eastern Tropical Pacific: Options for Adapting to Climate Change* IWC/61/18 (2009)
- Crawford, J., *The International Law Commission's Articles on State Responsibility: Introduction, Text and Commentaries* (2002)
- D M Richardson, et al, 'Naturalisation and Invasion of Alien Plants: Concepts and Definitions,' (2000) 6 *Diversity and Distributions* 93
- D Vanderzwaag 'The Precautionary Principle and Marine Environmental Protection: Slippery Shores, Rough Seas and Rising Normative Tides' (2002) 33(2) *Ocean Development and International Law* 165
- Davies, P. G. G., and C. Redgewell, 'The International Legal Regulation of Straddling Fish Stocks' (1996) 67 *British Yearbook of International Law* 199
- Davis, R., and E. Lee, 'Marine Environmental Protection and the Southern Ocean: The Maritime Jurisdiction Dimension of the Antarctic Treaty System' in A. G. Oude Elferink, and D. R. Rothwell (eds.), *The Law of the Sea and Polar Maritime Delimitation and Jurisdiction* (2001)
- de la Fayette, L., 'Responding to environmental damage in Antarctica' in G. Triggs, and A. Riddell, *Prospects for Polar Tourism* (2007)
- de Villiers, M. S., J. Cooper, N. Carmichael, J. P. Glass, G. M. Liddle, E. McIvor, T. Micol and A. Roberts, 'Conservation Management at Southern Ocean Islands: towards the Development of Best-Practice Guidelines' (2005) 75(2-3) *Polarforschung* 113
- Department of State and Arms Control and Disarmament Agency (US), *Joint Inspection in Eastern Antarctica Conducted in 1999 by Belgium and France under Article VII of the AT* ATCM XXIII IP 42 (1999)
- Di Paola M. E., and D. G. Kravetz, 'Invasive Alien Species: Legal and Institutional Framework Framework in Argentina' in M. L. Miller and R. N. Fabian, *Harmful invasive species: legal responses* (2004)
- DOC and MFish (2006) *Marine Protected Areas Policy and Implementation Plan* <
<http://www.biodiversity.govt.nz/pdfs/seas/MPA-Policy-and-Implementation-Plan.pdf>> at 30 September 2009

- DOC and MFish, *Marine Protection of New Zealand Subantarctic Islands* (2006) < <http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/marine-protected-areas/marine-protection-nz-subantarctic-islands-1.pdf>> at 10 October 2009
- Dodgshun, T. J., M. D. Taylor, and B. M. Forrest, 'Human-mediated pathways of spread for non-indigenous marine species in New Zealand', (2007) *DOC Research and Development Series* 266
- Dudley, N. (ed.), *Guidelines for applying protected area categories* IUCN (2008)< <http://data.iucn.org/dbtw-wpd/edocs/PAPS-016.pdf> > accessed 20 October 2009
- Economic Commission of ICAO, *Implementation of Resolution A35-19: Preventing the Introduction of Invasive Alien Species*, A36-WP/19 EC/4 (2007)
- Elliot, L. M., *International environmental politics: protecting the Antarctic* (1994)
- Endresen, O., H. L. Behrens, S. Brynestad, A. B. Anderson, and R. Skjong, 'Challenges in Global Ballast Water Management' (2004) 48 *Marine Pollution Bulletin* 615
- Ensminger, T. J., L. N. McCold, and J. W. Webb, 'Environmental Impact Assessment Under the National Environmental Policy Act and the Protocol on Environmental Protection to the Antarctic Treaty' (1999) 21(1) *Environmental Management* 13
- Enzenbacher, D. J., 'Antarctic tourism policy-making: current challenges and future prospects', in G. Triggs, and A. Riddell, *Prospects for Polar Tourism* (2007)
- Enzenbacher, D. J., 'The regulation of Antarctic tourism', in C. M. Hall, and M. E. Johnston (eds.), *Polar Tourism: Tourism in the Arctic and Antarctic Regions* (1995)
- Evans, M. D., *International law* (2003).
- Executive Secretary of the CBD, *Biological Diversity and Tourism: Development of Guidelines for Sustainable Tourism in Vulnerable Ecosystems* (2002)
- F Plaza, 'The Future for Flag State Implementation and Port State Control' in Centre for Oceans Law and Policy, *Current Maritime Issues and the International Maritime Organisation* (1999)
- Fabra, A., and V. Gascon, 'The Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) and the Ecosystem Approach' (2008) 23 *The International Journal of Marine and Coastal Law* 23.
- Fallon, L. D., and L. K. Kriwoken, 'Environmental Impact Assessment under the Protocol on Environment Protection to the Antarctic Treaty and Australian Legislation' (2005) 2 *Macquarie Journal of International and Comparative Environmental Law* 67
- FAO, *Report of the 26th Session of the FAO Committee on Fisheries*, Doc CL128/7 (2005)
- FAO, *Report of the Expert Consultation to Review Port State Measures to Combat [IUU] Fishing*, Rome 4-6 November 2002, FAO Fisheries Rep, no. 759 (2004).
- Farrell, R. L., S. Duncan, R. A. Blanchette, B. W. Held, J. A. Jurgens and B. A. Arenz, 'Scientific evaluation of deterioration of historic huts of Ross Island, Antarctica' in S. Barr and P. Chaplin (eds.) *Historical Polar Bases – Preservation and Management* (2008)
- Farrell, T. A., and J. L. Marion, 'The Protected Area Visitor Impact Management (PAVIM) Framework: A Simplified Process for Making Management Decisions,' (2002) 10 *Journal of Sustainable Tourism* 1
- Finland, *Report Of The 2004 Finnish Antarctic Inspection Under Article VII Of The Antarctic Treaty And Article 14 Of The Protocol On Environmental Protection To The Antarctic Treaty* ATCM XXVII IP 31 (2004)
- Firestone, J., and J. Corbett, 'Coastal and Port Environments: International legal and Policy Responses to Reduce Ballast Water Introductions of Potentially Invasive Species,' (2005) 36 *Ocean Development and International Law* 302.
- Fitzmaurice, M., 'International responsibility and liability' in D. Bodansky, J. Brunnée, and E. Hay (eds.), *The Oxford Handbook of international environmental law* (2007)
- Foreman, E. F., 'Protecting the Antarctic Environment: Will a Protocol be Enough?' (1991-1992) 7 *American University Journal for International Law* 843
- Fortune, A. L., *Biosecurity at the Extreme: Pathways and Vectors between New Zealand and Scott Base, Antarctica* (Masters Thesis, University of Canterbury, 2006)
- France, New Zealand, Russian Federation and United States, *Report of the CEP and SC-CAMLR Joint Workshop* ATCM XXXII WP 55 (2009) ('Joint CEP and SC-CAMLR Workshop')
- Francesco, F., 'International Responsibility for Damage to the Antarctic Environment' in F Francioni (ed.) *International Environmental Law for Antarctica* (1992)
- Francesco, F., 'Liability for Damage to the Antarctic Environment' in F Francioni (ed.) *International Environmental Law for Antarctica* (1996)
- Francioni, F., 'Establishment of an Antarctic Treaty Secretariat: Pending Legal Issues' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)

- Franckx, E., *Vessel sourced pollution and coastal state jurisdiction: the work of the ILA Committee on Coastal State Jurisdiction Relating to Marine Pollution (1991-2000)* (2001)
- Freestone, D., 'International Fisheries Law Since Rio: The Continued Rise of the Precautionary Principle' in A. Boyle and D. Freestone (eds.) *International Law and Sustainable Development: Past Achievements and Future Challenges* (1999)
- Freestone, D., and S. M. A. Salman, 'Ocean and Freshwater Resources' in Bodansky, D, Brunnee, J and Hey, E, *The Oxford Handbook of International Law* (2008)
- Frenot, Y., P. Convey, M. Lebouvier, S. L. Chown, J. Whinam, P. M. Selkirk, M. Skotnicki and D. M. Bergstrom, 'Antarctic and Subantarctic Biological Invasions: Sources, Extents, Impacts and Implications' in M. Rogan-Finnemore (ed.), *Non-Native Species in the Antarctic Proceedings* (2008)
- Frenot, Y., S. L. Chown, J. Whinam, P. M. Selkirk, P. Convey, M. Skotnicki and D M Bergstrom, 'Biological Invasions in the Antarctic: extent, impacts and implications,' (2005) 80 *Biological Reviews* 45
- Garcia, S. M., 'The precautionary principle: Its implications in capture fisheries management' (1994) 22 *Ocean and Coastal Management* 99
- Garner, B. A. (ed.), *Black's Law Dictionary* (9th ed , 2009)
- Gaston K. J., A. G. Jones, C. Hänel and C. L. Chown, 'Rates of species introduction to a remote oceanic island', (2003) *Proceedings of the Royal Society of London* series B-270
- Gautier, P., 'Institutional Developments in the Antarctic Treaty System' in F. Francioni and T. Scovazzi, *International law for Antarctica* (1996)
- Gautier, P., 'The Maritime Area of the Antarctic and the New Law of the Sea' in J. Verhoeven, P. Sands and M. Bruce (eds.), *The Antarctic Environment and Environmental Law*, (Proceedings of a symposium held in October 1990 in Brussels, Belgium, 1992)
- Germany and United Kingdom, *Report Of A Joint Inspection Under Article VII Of The Antarctic Treaty Antarctic Treaty Inspection Programme: January, 1999* ATCM XXIII WP 23 (2000)
- Germany, *Third National Report on the Implementation of the CBD* (2005)
- Gillespie, A., 'Defining Internationally Protected Areas' (2009) 12 *Journal of International Wildlife Law and Policy* 229
- Gillespie, A., 'Obligations, Gaps and Priorities within the International Regime for Protected Areas' (April 2006) *Georgetown International Environmental Law Review*
<http://findarticles.com/p/articles/mi_qa3970/is_200610/ai_n19430539/?tag=content;col1> Accessed 30 July 2009
- Gjerde, K. M., 'Protecting Particularly Sensitive Sea Areas: A Review of IMO's New PSSA Guidelines,' in H Thiel and A Koslow (eds) *Managing Risks to Biodiversity and the Environment on the High Sea, Including Tools Such as Marine Protected Areas – Scientific Requirements and Legal Aspects* (2001), 124
- Glowka, L. and de Klemm, C, International Instruments, Processes and Non-indigenous Species Introductions: Is a Protocol to the Convention on Biological Diversity Necessary (1999) 26(6) *Environmental Policy and Law*
- Goetschel, A. F., *Legal Analysis of IWC Competence to Manage Small Cetaceans* (1998)
<http://www.oceancare.org/de/downloads/OceanCare_Reports/ASMS_Legal_Opinion__Small_Cetacean_WEB.pdf>
- Goldsworthy, L., and A. D. Hemmings, 'The Antarctic Protected Areas Approach' in S. Hart (ed.) *Shared Resources: Issues of Governance*, (2008) IUCN Environmental Law and Policy Paper No.72
- Gollasch, S., M. David, M. Voigt, E. Dragsund, C. Hewitt and Y. Fukuyo, 'Critical Review of the IMO International Convention on the Management of Ships' Ballast Water and Sediments' (2007) 6 *Harmful Algae* 585
- Gollasch, S., S. Carlberg and E. Kenchington, *Code of Practise on the Introductions or Transfers of Marine Organisms of the International Council for the Exploration of the Sea* (2004)
- Gröndahl, F., J. Sidenmark and A. Thompson, 'Survey of waste water disposal practices at Antarctic research stations' in (2009) 28(2) *Polar Research* 298
- Haase, D., M. Lamers, and B. Amelung, 'Heading into uncharted territory? Exploring the institutional robustness of self-regulation in the Antarctic tourism sector,' (2009) 17 (4) *Journal of Sustainable Tourism* 411
- Haase, D., *Tourism in the Antarctic: Modi Operandi and Regulatory Effectiveness* (D Phil Thesis, University of Canterbury)
- Hallegraff, G. M., 'Transport of toxic dinoflagellates via ships' ballast water: bioeconomic risk assessment and efficacy of possible ballast water strategies,' (1998) 168 *Marine Ecology Progress Series* 306
- Hardin G, 'The Tragedy of the Commons.' (1968) 162 *Science* 1243
- Harlan, J. R., *Crops and Man* (1992)

- Harrison, J., and M. Collins, 'Harmonising the information management infrastructure for biodiversity-related treaties,' (Paper presented at the United Nations University International Conference on Inter-linkages: Synergies and Coordination between Multilateral Environmental Agreements, Tokyo, Japan, 1999).
- Harrop O. D., and A. J. Nixon, *Environmental Assessment in Practice* (1999)
- Heap J., 'Antarctic Treaty System' in B Riffenburgh (ed.) *Encyclopaedia of the Antarctic* (2007)
- Hemmings A. D., and R. Roura, 'A square peg in a round hole: fitting impact assessment under the Antarctic Environmental Protocol to Antarctic tourism' (2003) 21(1) *Impact Assessment and Project Appraisal* 13
- Hemmings, A. D., 'Agreement to a Liability Annex to the Protocol' (2005) 23 *Antarctic Science* 50
- Hemmings, A. D., 'Problems Posed by Attempts to Apply a Claimant's Domestic Legislation Beyond its Own Nationals in Antarctica,' (2008) (3 & 4) 11 *Asia Pacific Journal of International Law* 207
- Hemmings, A. D., 'Tourism Accreditation under the Antarctic Treaty,' (Paper given at the Australian Antarctic Tourism Workshop, 23 September 2004)
- Hemmings, A. D., 'Tourism Accreditation under the Antarctic Treaty' Paper presented at the Australian Antarctic Tourism Workshop, 23 September 2004
- Hemmings, A. D., and L. K. Kriwoken, 'High Level Environmental Impact Assessment under the Madrid Protocol: state practice and the effectiveness of the Comprehensive Environmental Evaluation process' (2010) *International Environmental Agreements: Politics, Law and Economics* (published online Springerlink 10 February 2010, 10.1007/s10784-010-9119-5).
- Hemmings, A. D., and T. Stephens (2009) 'Australia's Extended Continental Shelf: What Implications for Antarctica?' 20(1) *Public Law Review* 9
- Hemmings, A. D., K. N. Scott and M. Rogan-Finnemore, 'Broadening the duty in relation to Environmental Impact Assessment across the legal instruments applying in Antarctica' (Paper presented at 15th Annual Conference of the Australian and New Zealand Society of International Law 'Restoring the Rule of Law in International Affairs', Canberra, Australia, 28-30 Jun 2007)
- Herkenrath, P *Options for harmonizing national reporting to biodiversity-related agreements* UNEP-WCMC Information Document (2005)
- Herr, R. A., 'CCAMLR and the Environmental Protocol: Relationships and Interactions' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- Herr, R.A., H. R. Hall, and M. G. Haward, *Antarctica's future, continuity or change?* (1990)
- Hewitt, C. L., M. L. Campbell, and S. Gollasch, *Alien Species in Aquaculture: Considerations for Reasonable Use* (2006)
- Hodges, B. T., 'The Cracking Façade of the International Whaling Commission as an Institution of International Law: Norwegian Small-Type Whaling and the Aboriginal Substinence Exception' (2000) 15 *Journal of Environmental Law and Litigation* 295.
- Hohmann, H., *Precautionary Legal Duties and Principles of Modern International Environmental Law* (1994)
- Homan, A., 'Maritime Zones in Antarctica,' (2006) 11 *Australian and New Zealand Maritime Law Journal* 69
- Hopkins, G. A., and B. M. Forrest, 'Management options for vessel hull fouling: an overview of risks posed by in-water cleaning,' (2008) 65 *ICES Journal of Marine Science* 5
- Hughes K A, Convey P, Maslan N R and Smith R I L, 'Accidental transfer of non native soil organisms into Antarctica on construction vehicles' (2010) 12 *Biological Invasions* 877
- Hull, B. B., and D. M. Bergstrom, 'Antarctic Terrestrial and Limnetic Ecosystem Conservation and Management' in D. M. Bergstrom, P. Convey and H. L. Huiskes (eds), *Trends in Antarctic Terrestrial and Limnetic Ecosystems* (2006)
- Hurdle, T., *Macquarie Island Fishery* (2005)
<<http://www.environment.gov.au/coasts/fisheries/commonwealth/macquarie-toothfish/decision-rundle.html>> at 30 September 2009
- Huston, M., N. Gilbert, and J. Newman (eds.), *Final Comprehensive Environmental Evaluation for ANDRIL, ANZ* (2006)
- IAATO, *2003-4 Number of Tourists per Site per Vessel – All Antarctic Sites*, (2004)
<http://image.zenn.net/REPLACE/CLIENT/1000037/1000116/application/vnd.ms-excel/touristsitevisitct_byvessel_all.xls> at 3 January 2010.
- IAATO, *2004-5 Number of Tourists per Site per Vessel – All Antarctic Sites* (2005)
<http://image.zenn.net/REPLACE/CLIENT/1000037/1000116/application/vnd.ms-excel/visitorsitevisitct_byvessel_all0.xls> at 3 January 2010.
- IAATO, *2005-6 Number of Tourists per Site per Vessel – All Antarctic Sites* (2006)
<http://image.zenn.net/REPLACE/CLIENT/1000037/1000116/application/vnd.ms-excel/visitorsitevisitct_byvessel_all2.xls> at 3 January 2010.

IAATO, *2006-7 Number of Tourists per Site per Vessel – All Antarctic Sites* (2007)
<http://image.zenn.net/REPLACE/CLIENT/1000037/1000116/application/vnd.ms-excel/VSV-vessel-all.xls> at 3 January 2010.

IAATO, *2007-8 Number of Tourists per Site per Vessel – All Antarctic Sites* (2008)
http://image.zenn.net/REPLACE/CLIENT/1000037/1000116/application/vnd.ms-excel/Visitorsitevisitct_byvessel_all1.xls at 3 January 2010.

IAATO, *2008-9 Number of Tourists per Site per Vessel – All Antarctic Sites* (2009) <
http://image.zenn.net/REPLACE/CLIENT/1000037/1000116/application/vnd.ms-excel/10.visitorsitevisitct_byvessel_all6sheets.xls> at 3 January 2010.

IAATO, *Boot, Clothing and Equipment Decontamination Guidelines for Small Boat Operations* (2007).

IAATO, *Brief Update on the Antarctic Peninsula Landing Site Visits and Site Guidelines* ATCM XXX IP 114 (2007)

IAATO, *Brief Update on the Antarctic Peninsula Landing Site Visits and Site Guidelines* ATCM XXX IP 114 (2007)

IAATO, *Decontamination Guidelines and the Introduction and Detection of Diseases in Antarctic Wildlife: IAATO's Perspective* ATCM XXVIII IP 97 (2005)

IAATO, *Decontamination Guidelines and the Introduction and Detection of Diseases in Antarctic Wildlife: IAATO's Perspective* ATCM XXVIII IP 97 (2005)

IAATO, *IAATO Overview of Antarctic Tourism 2007-2008 Antarctic Season and Preliminary Estimates for 2008-2009 Antarctic Season* IP 84 ATCM XXXI (2008)

IAATO, *IAATO Overview of Antarctic Tourism 2008-2009 Antarctic Season and Preliminary Estimates for 2009-2010 Antarctic Season*, ATCM XXXII IP 86 rev 2 (2009)

IAATO, *IAATO Overview of Antarctic Tourism: 2008-2009 Antarctic Season and Preliminary Estimates for 2009-2010 Antarctic Season*, ATCM XXXII IP 86 rev 1 (2009)

IAATO, *IAATO Overview of Antarctic Tourism: 2009-10 Season and Preliminary Estimates for 2010-11 and Beyond* ATCM XXXIII IP 113 (2010)

IAATO, *Land-Based Tourism and the Development of Land-based Tourism Infrastructure in Antarctica: An IAATO Perspective* ATCM XXIX IP85 (2006)

IAATO, *Overview of Antarctic Tourism: 2009-10 Season and Preliminary Estimates for 2010-11 and Beyond* (2010) XXXIII ATCM IP 113

ICAO, *Non-chemical disinsection of the aircraft cabin and flight deck for international flights* Resolution A36-24 (2007)

ILC, *Draft Articles on Responsibility of States for Internationally Wrongful Acts* (2001), 56 U.N. GAOR Supp. (No. 10) at 43, N Doc. A/56/10 <<http://untreaty.un.org/ilc/summaries/9.htm>> at 9 February 2009

ILC, *Prevention of Transboundary Harm from Hazardous Activities* (2001), Official Records of the General Assembly, Fifty sixth Session, Supplement No. 10 (A/56/10)

India, *Draft CEE of New Indian Research Base at Larsemann Hills, Antarctica* ATCM XXX IP 7(2006)

India, *Establishment of a New Indian Research Base in the Larsemann Hills, East Antarctica* ATCM XXIX WP 20 (2008)

Infante, M. T., 'The Application of the Antarctic Treaty System to the Protection of the Antarctic Marine Environment' in F Francioni (ed.) *International Environmental Law for Antarctica* (1992)

International Law Commission, *Draft principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities, with commentaries* (2006)
http://untreaty.un.org/ilc/texts/instruments/english/commentaries/9_10_2006.pdf at 12 November 2008

IUCN SSC ISSG, *IUCN Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species*, (2000)

IUCN, *Antarctic NNS: what can we learn from the global situation?* ATCM XXIX IP 57 (2006)

IUCN, *Guidelines for Protected Areas Management Categories* (1994) <http://www.unep-wcmc.org/protected_areas/categories/eng/index.html> at 5 January 2010

IUCN, *Introduction of NNS in the Antarctic area: An increasing problem* ATCM XXII IP 53 (1998)

IUCN, *Introduction of NNS, Parasites and Diseases* ATCM XXVIII IP 63 (2005).

IUCN, *Prevention and Management of Harmful NNS in the Antarctic and the sub-Antarctic* ATCM XXX, IP 126 (2007).

Jacobsson, M., 'The Antarctic Treaty system: legal and environmental issues – future challenges for the Antarctic Treaty System' in G. Triggs, and A. Riddell, *Prospects for Polar Tourism* (2007)

Japan, *Third National Report on the Implementation of the CBD* (2005)

Jay, M., M. Morad, and A. Bell, 'Biosecurity: A policy dilemma for New Zealand' (2003) 20 *Land Use Policy* 121

Johnson, L. S., *Coastal State Regulation of International Shipping* (2004)

- Johnston, M., 'Liability for Environmental Damage in Antarctica: The Adoption of Annex VI to the Antarctic Environmental Protocol' (2006) *Georgetown International Environmental Law Review*
<http://findarticles.com/p/articles/mi_qa3970/is_200610/ai_n19430538/?tag=content;col1> at 30 July 2009
- Johnston, S., 'The Relationship between an International Regime on Access and Benefit Sharing and the ATS and UNCLOS,' (2009) UNEP/CBD/WG-ABS/INF/3/Part.3
- Joyner, C. C., 'Fragile Ecosystems: Preclusive Restoration in the Antarctic, (1994) 34 *Natural Resources Journal* 879
- Joyner, C. C., 'Maritime Zones in the Southern Ocean: problems concerning the correspondence of natural and legal maritime zones' 10(4) *Applied Geography* 307
- Joyner, C. C., 'Recommended measures under the Antarctic Treaty: Hardening Compliance with Soft International Law' (1998) 19 *Michigan Journal of International Law* 401
- Joyner, C. C., 'The 1991 Madrid Environmental Protection Protocol: Contributions to marine pollution law,' (1996) 20(3) *Marine Policy* 193
- Joyner, C. C., 'The Antarctic Treaty and the law of the sea: fifty years on,' (2009) 46 *Polar Record* 1
- Joyner, C. C., 'The emerging legal regime for navigation through Antarctic ice-covered waters' in G. Triggs, and A. Riddell, *Prospects for Polar Tourism* (2007)
- Joyner, C. C., 'The Exclusive Economic Zone and Antarctica' (1981) 21(4) *Virginia Journal of International Law* 691
- Joyner, C. C., 'The United States: Legislation and Practice in Implementing the Protocol' in D. Vidas (ed.), *Implementing the Environmental Protection Regime for the Antarctic*, 420-422
- Joyner, C. C., *Antarctic and the law of the sea* (1992)
- Joyner, C. C., *Governing the frozen commons: the Antarctic regime and environmental protection* (1998)
- Joyner, C. C., *The United Nations and international law* (1997)
- Kachel, M. J., *Particularly sensitive sea areas: the IMO's role in protecting vulnerable environments* (D Phil Thesis, University of Hamburg, 2008)
- Kakabadse, Y., 'The Antarctic Protected Areas System: Challenges and Practise', in J Valencia (ed.) Report of the Second Antarctic Protected Areas Workshop held in Lima, Peru 22-23 May 1999 (2000)
- Kallas, J., *Edible Wild Plants: Wild Foods from Dirt to Plate* (1997)
- Kate, K. T., and S. A. Laird, *The Commercial Use of Biodiversity: Access to Genetic Resources and Benefit Sharing* (1999)
- Kaye, S. B., 'The Outer Continental Shelf in the Antarctic' in A. G. Oude Elferink, and D. R. Rothwell (eds.), *The Law of the Sea and Polar Maritime Delimitation and Jurisdiction* (2001)
- Kaye, S. B., D. Rothwell and S. Dando, *The laws of the Australian Antarctic Territory* (1999)
- Kaye, S., 'IUU Fishing in the Southern Ocean: challenge and response' in G. Triggs, and A. Riddell, *Prospects for Polar Tourism* (2007)
- Kaye, S., 'Threats from the Global Commons: Problems of Jurisdiction and Enforcement,' (2007) 8 *Melbourne Journal of International Law* 186
- Kennedy, K. C., 'Resolving International Sanitary and Phytosanitary Disputes in the WTO: Lessons and Future Directions' (2000) 55 *Food and Drug Journal* 81
- Kennish, M. K., 'Environmental threats and the environmental future of estuarine,' (2002) 29 *Environmental Conservation* 1.
- Kimball, L. A., 'The Role of Non-Governmental Organisations in Antarctic Affairs' in C. C. Joyner, and S. K. Chopra (eds.), *The Antarctic Legal Regime* (1988)
- Koivurova, T., *Environmental Impact Assessment in the Arctic: A study of international legal norms* (2002)
- Kriwoken, L., and N. Holmes, 'Snapshot Seven: Emerging Issues of Macquarie Island and Heard Island and McDonald Islands' in Australian Government's Cooperative Research Centres Program for Sustainable Tourism Pty Ltd, *Australian Antarctic and Sub Antarctic Tourism: Towards a Sustainable Industry* (2009)
- La Fayette L. A., 'The Sound Management of Wastes Generated at Sea: MARPOL, not Basel', (2009) 39 (4/5) *Environmental Policy and Law* 207
- Laihonen, P., M. Rönkä, H. Tolvanen, and R. Kalliola, 'Geospatially structured biodiversity information as a component of a regional biodiversity clearing house' (2003) 12 *Biodiversity and Conservation* 103
- Lamers, M., J. H. Stel and B. Amelung, 'Antarctic Adventure Tourism and Private Expeditions' in J. M. Snyder, and B. Stonehouse, (eds.) *Prospects for Polar Tourism* (2007)
- Landau, D and Splettstoesser, J., 'Antarctic Tourism: What are the Limits?' in J. M. Snyder, and B. Stonehouse, (eds.) *Prospects for Polar Tourism* (2007)

- Leader-Williams, N., D. W. H. Walton, P. A. Prince, 'Introduced Reindeer in South Georgia – A Management Dilemma', (1989) 47 *Biological Conservation* 11
- Lee, J. E. and S. L. Chown, 'Quantifying the propagule load associated with the construction of an Antarctic research station,' (2009) 21 *Antarctic Science* 5
- Lee, J. E. and, S. L. Chown, 'Mylitus on the move: transport of an invasive bivalve on the Antarctic' (2007) 339 *Marine Ecology Progress Series* 309
- Lee, J. E., and S. L. Chown, 'Quantifying the propagule load associated with the construction of an Antarctic research station,' (2009) 21 *Antarctic Science* 5
- Lefeber, R., 'The Legal Need for an Antarctic Environmental Liability Regime' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- Lefeber, R., 'The Prospects for an Antarctic Environmental Liability Regime' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- Lewis, P. N., and R. Summerson, *Assessing the Risks of Invasion by Marine Pests of Macquarie Island DEWHA* (2005)
- Lewis, P. N., D. M. Bergstrom and J. Whitnam, 'Barging in: a temperate marine community travels to the Subantarctic,' (2006) 8 *Biological Invasions* 787
- Lewis, P. N., Riddle M. J. and S. D. A. Smith, 'Assisted passage or passive drift: a comparison of alternative transport mechanisms for non-indigenous coastal species into the Southern Ocean,' (2005) 17 *Antarctic Science* 183
- Lisle, J.T., J.J. Smith, D.D. Edwards, and G.A. McFeters, 'Occurrence of microbial indicators and Clostridium perfringens in wastewater, water column samples, sediments, drinking water, and Weddell Seal feces collected at McMurdo Station Antarctica' (2004) 70 *Applied and Environmental Microbiology* 7269
- Lynch, H. J., K. Crosbie, W. F. Fagan, and R. Naveen, 'Spatial patterns of tour ship traffic in the Antarctic Peninsula region' (2009) 22(3) *Antarctic Science* 123
- Lyons, D., 'Environmental Impact Assessment in Antarctica under the Protocol on Environmental Protection' (1997) 29 *Polar Record* 223 1993
- MAFBNZ, *New Zealand's response to the International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004; Summary and Analysis of Submissions on Discussion Paper* (2008) <<http://www.biosecurity.govt.nz/files/biosec/consult/ballast-water-subs.pdf>> at 4 September 2009
- MAFBNZ, *Review of the Undaria Commercial Harvest Policy*, MAF Biosecurity new Zealand Discussion Paper No: 2009/02
- Maguire, J., The state of world highly migratory, straddling and other high seas fishery, (2006) FAO Fisheries technical paper No. 495
- Manhire, B., (ed.) *The Wide White Page: Writer's imagine Antarctica* (2004)
- Mansfield, B., and N. Gilbert, 'Availability and Applicability of Legal Tools for Managing Non-native Species,' in M. Rogan-Finnemore (ed.), *Non-Native Species in the Antarctic Proceedings* (2008)
- Margois, M., J. F. Shogren and C. Fischer, 'How Trade Politics Affect Invasive Species Control', (2005) 52 *Ecological Economics* 310
- Marsden, S., *Strategic Environmental Assessment in International and European Law: A Practitioners Guide* (2008)
- McConnel, M., *Globallast Legislative Review Final Report*, GloBallast Monography Series No.1 (2002)
- McDorman, T. L., "Port State Enforcement: A Comment on Article 218 of the 1982 Law of the Sea Convention," (1997) 28 *Journal of Maritime Law and Commerce* 305
- McGraw, D. M., 'The CBD – Key Characteristics and Implications for Implementation,' (2002) 11 *Review of European Community and International Environmental Law* 1
- McIntyre, D., M. McIntyre and A. Broadbent, *IEE Australian Non-Governmental Operations in Antarctica: "MV Orion 2008/09"* (2008)
- Meltzer, E., 'Global overview of Straddling and Highly Migratory Fish Stocks,' (Paper presented at the St Johns Conference on Governance of High Seas Fisheries and the UN Fish Agreement, May 1-5, 2005)
- MEPC, *List of ballast water management systems that make use of Active Substances which received Basic and Final Approvals BWM.2/Circ.23* (2009)
- MEPC, *Report of MEPC 59th session* (2009) <http://www.imo.org/newsroom/mainframe.asp?topic_id=109&doc_id=11123> at 10 January 2010
- Miller, D. G. M., E. N. Sabourenkov, and D. C. Ramm, 'Managing Antarctic Marine Living Resources: The CCAMLR Approach,' (2004) 19(3) *The International Journal of Marine and Coastal Law* 317

- Miller, M. L. and L. H. Gunderson, 'Biological and Cultural Camouflage: the Challenges of Seeing the Harmful Invasive Species Problem and Doing Something About It', in M L Miller and R N Fabian, *Harmful invasive species: legal responses* (2004)
- Molenaar, E. J., 'CCAMLR and Southern Ocean Fisheries,' (2001) 16(3) *The International Journal of Marine and Coastal Law* 479
- Molenaar, E. J., 'Port State Jurisdiction: Towards Comprehensive, Mandatory and Global Coverage', (2007) 38(1) *Ocean Development and International Law* 225
- Molenaar, E. J., 'Sea-borne Tourism in Antarctica: Avenues for Further Intergovernmental Regulation' (2005) 20 *International Journal for Marine and Coastal Law* 2
- Molenaar, E. J., and A. G. O. Elferink, 'Marine protected areas in areas beyond national jurisdiction: the pioneering efforts under the OSPAR Convention,' (2009), 5(1) *Utrecht Law Review* 5
- Molenaar, E. J., *Coastal state jurisdiction over vessel-source pollution* (1998)
- Mora, C., R. A. Myers, M. Coll, S. Libralato, T. J. Pitcher, R. U. Sumaila, D. Zeller, R. Watson, K. J. Gaston, B. Worm, 'Management effectiveness of the world's marine fisheries', (2009) 7(6) *PLoS Biology*, e1000131. doi:10.1371/journal.pbio.1000131
- Mossop, J., 'Opposing Japanese Whaling in the Southern Ocean' (2008) 11 (3-4) *Asia Pacific Journal of International Law* 227
- Munk, T., and Propulsion Dynamics Inc, 'Fuel Conservation through Managing Hull Resistance' (Paper presented at the Motorship BIMCO Propulsion Conference, Copenhagen, 27 May 2009).
- Netherlands, *Inspection of Ships in Gateway Ports to Antarctica, on the basis of MARPOL 73/78, and in Antarctic Ports under the Environmental Protocol (Annex IV) to the Antarctic Treaty ATCM XX WP 9* (1996)
- New Zealand Longline, *Antarctic Chieftan, IEE – 2008/2009* (2009)
- New Zealand, "NNS in the Antarctic" A Workshop ATCM XXIX IP 46 (2006)
- New Zealand, "NNS in the Antarctic": Report of a Workshop ATCM XXIX WP 13 (2006)
- New Zealand, *A framework for analysing and managing NNS risks in Antarctica* ATCM XXXII IP 36 (2009)
- New Zealand, *A new wastewater treatment system for New Zealand's Scott Base – rationale, selection process and outcome* ATCM XXV IP 32 (2002)
- New Zealand, *A Proposal to Enhance Port State Control for Tourist Vessels Departing to Antarctica ATME Ship Borne Tourism WP 08* (2009).
- New Zealand, Australia, UK, Friends of the Earth International and the IUCN, *Development of international measures for minimizing the translocation of invasive aquatic species through biofouling of ships* MPEC 56/19/3 (2007)
- New Zealand, *Discussion on Liability issue (compilation)* ATCM XXIV WP 38 (2001)
- New Zealand, *ISO 14001 Environmental Management System in New Zealand Institute Experience SATCM XII IP 15* (2000).
- New Zealand, *NNS Incursions at Scott Base, Antarctic* ATCM XXXI, IP 75 (2008)
- New Zealand, *Non-native species: Pathways and Vectors between New Zealand and Scott Base, Antarctica* ATCM XXX, IP 36 (2007).
- New Zealand, *Science Supported by New Zealand*, ATCM XXXII IP 24 (2009)
- New Zealand, *Systematic Environmental Protection in Antarctica : Final Report on Environmental Domains Analysis for the Antarctic continent as a dynamic model for a systematic environmental geographic framework for Annex V of the Protocol* ATCM XXXI WP 12 (2008)
- New Zealand, *The Invasive Species Database* ATCM XXX, IP 43 (2007)
- New Zealand, *The New Zealand Biodiversity Strategy* (2000)
<<http://www.biodiversity.govt.nz/pdfs/picture/nzbs-whole.pdf>> at 1 September 2009 ('NZ Biodiversity Strategy')
- New Zealand, *Tourist Vessels flagged to non Parties; Implications for the effectiveness of the ATS* ATCM XXX WP 14 (2007)
- New Zealand, *United Kingdom and United States, Ross Sea Protected Area Inspections 2006* ATCM XXIX WP 34 (2006)
- Nimmo-Bell, 'Economic Costs of Pests to New Zealand', MAF Biosecurity Technical Paper 31 (2009)
- Njåstad, B., 'Protocol on Environmental Protection to the Antarctic Treaty' in B. Riffenburgh (ed.), *Encyclopedia of the Antarctic* (2007)
- Norway, *Report of the 2001 Norwegian Antarctic inspection under Article VII of the Antarctic Treaty and Article 14 of the Protocol on Environmental Protection to the Antarctic Treaty* ATCM XXIV WP 25 (2001)

- Nussbaum, U., 'Legal status of Antarctic off-shore areas', (1993) 6 *Antarctic and Southern Ocean law and policy occasional paper* 1
- O Floert, et al, 'Efficacy of hull cleaning operations in containing biological material: 1. Risk assessment,' MAF Biosecurity New Zealand Technical Paper No 06/12 (2005)
- Oppenheim, L., R. Y. Jennings and A. Watts, *Oppenheim's International Law*, R. Y. Jennings, A. Watts (eds.) (9th ed., 1992)
- Ornheim, O, 'The Committee for Environmental Protection: Its Establishment, Operation and Role within the Antarctic Treaty System' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- Perrault, M., and W. Carroll William, 'Turning off the Tap: A strategy to Address International Aspects of Invasive Alien Species,' (2002) 11(2) *Review of European Community and International Environmental Law* 211
- Peterson, M. J. *Managing the frozen south: the creation and evolution of the Antarctic treaty system* (1988)
- Pharo, H. J., 'Acceptable Risk in Animal Biosecurity Import Risk Analysis – the limits of rationalism' (2004) 27 (3) *Public Sector* 8
- Phillips, A., *Management Guidelines for IUCN Category V Protected Areas: Protected Landscapes/Seascapes*, Best Practise Protected Areas Guidelines Series No. 9 (2002)
- Picco, A. M., Amphibian commerce and the spread of infectious disease in wildlife, (D Phil Thesis, Arizona State University, August 2008)
- Pineschi, L., 'The Madrid Protocol on the Protection of the Antarctic Environment and its Effectiveness' in F. Francioni and T. Scovazzi, *International law for Antarctica* (1996)
- Piola, R. F., K. A. Dafforn and E. L. Johnston, 'The influence of antifouling practices on marine invasions', (2009) 25(7) *Biofouling* 633, 641
- Pitcher T, D. Kalikoski, K. Short, D. Varkey, and G. Pramod, 'An evaluation of progress in implementing ecosystem-based management of fisheries in 33 countries', (2009) 33(2) *Marine Policy* 223
- Pitcher, T., D. Kalikoski, G. Pramod, and K. Short, 'Safe conduct? Twelve years fishing under the UN code', *WWF report* (2008)
- Plaza, F., 'The Future for Flag State Implementation and Port State Control' in Center for Oceans Law and Policy, *Current Maritime Issues and the International Maritime Organisation* (1999)
- Polk, W. A., 'Welcome to the Hotel Antarctica: The EPA's Interim Rule on Environmental Impact Assessment of Tourism In Antarctica,' (1998) 12 *Emory International Law Review* 1421
- Potter, S., 'The Quarantine Management of Australia's Antarctic Program' (2006) 13 *Australian Journal of Environmental Management* 185
- Potter, S., 'The Quarantine Protection of Sub-Antarctic Australia: Two Islands, Two Regimes' (2007) 2(2) *Island Studies Journal* 177
- Potter, S., and T. Maggs, 'Antarctic Quarantine Management: Australia's Framework and Practice' in M. Rogan-Finnemore (ed.), *Non-Native Species in the Antarctic Proceedings* (2008)
- R J Hall and C A Langham, 'The U.S. National Amphibian Research and Monitoring Initiative and the Role of Protected Areas,' (2001) 18 *The George Wright Forum* 2
- R N Clark and G H Stankley, 'The Recreation Opportunity Spectrum: A Framework for Planning, Management and Research', (1979) General Technical Report PNW-98:
<http://72.41.119.75/Library/Visitor_Experience_Management/Recreation_Opportunity_Spectrum_1979.pdf> at 21 September 2009
- Ramsar Convention, *Ramsar Handbook Three: Laws and Institutions* (3rd ed, 2007)
- Rayfuse, R. G., *Non-flag state enforcement in high seas fisheries* (2004)
- Redgewell, C., 'Environmental Protection in Antarctica: the 1991 Protocol. (1994) 43 *International and Comparative Law Quarterly* 599
- Richardson, M., G., 'Regulating Tourism in the Antarctic: Issues of Environment and Jurisdiction,' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- Riley, S., 'Invasive Alien Species and the Protection of Biodiversity: the Role of Quarantine Laws in Resolving Inadequacies in the International Legal Regime,' (2005) 17 *Journal of International Law* 3, 356.
- Roberts, J., 'Protecting sensitive marine environments: the role and application of ships' routeing measures' (2005) 20(1) *International Journal of Marine and Coastal Law* 135
- Roberts, J., and M. Tsameyi, 'International legal options for the control of biofouling on international vessels,' (2008) 32 *Marine Policy* 559
- Rogan-Finnemore, M., *The Legal Implications of Bioprospecting in the Antarctic* (LLM, University of Canterbury, 2005)

- Rothwell D. R., 'Relationship between the Environmental Protocol and UNEP Instruments' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- Rothwell, D. R. and S. V. Scott, 'Flexing Australian Sovereignty in Antarctica: Pushing Antarctic National Treaty Limits in the National Interest,' in L. Kriwoken, J. Jabour and A. Hemmings (eds.) *Looking South: Australia's Antarctic Agenda* (2007)
- Rothwell, D. R., 'A Maritime Analysis of Conflicting International Law Regimes in Antarctica and the Southern Ocean' (1994) 15 *Australian Yearbook of International Law* 382
- Rothwell, D. R., 'The Protocol and its relationship with the Antarctic Treaty System' (1992) 5 *Antarctic and Southern Ocean Law and Policy Occasional Papers* 1
- Rothwell, D. R., 'UNEP and the Antarctic Treaty System,' (1999) 29(1) *Environmental Policy and Law* 17
- Rothwell, D. R., *A world park for Antarctica?: foundations, developments and the future* (1992)
- Rothwell, D. R., and R. Davis, *Antarctic environmental protection: a collection of Australian and international instruments* (1997)
- Rothwell, D. R., and R. Davis, *Antarctic environmental protection: a collection of Australian and international instruments* (1997)
- Rothwell, D. R., *The Polar regions and the development of international law* (1996)
- Russian Federation, *Drilling of an Additional 75 m in deep Borehole 5G-1 at Vostok Station IEE ATCM XXIX IP 68* (2006)
- Russian Federation, *Results of Russian studies of the subglacial Lake Vostok during the season 2007-2008 ATCM XXXI IP 44* (2008)
- Russian Federation, *Water Sampling of the Subglacial Lake Vostok: Draft Comprehensive Environmental Evaluation (revised) ATCM XXVI WP 01* (2003)
- Sabourenkov, E. N. and D. G. M. Miller, 'The Management of Transboundary Stocks of Toothfish, *Dissostichus* spp, under the Convention on the Conservation of Antarctic Marine Living Resources,' in A. I. L. Payne, C. M. O'Brien and S. I. Rogers (eds.) *Management of Shared Fish Stocks* (2004)
- Sahatjian, L. C., 'MARPOL – an Adequate Regime? A Questioning look at Port and Coastal State Enforcement.', (Paper presented at the International Oil Spill Conference 1998)
- SATCM XII, *Final Report of the SATCM XII Meeting* (2000)
- SATCM, *Final Report of the II-1 Meeting* (1978)
- SATCM, *Final Report of the II-2 Meeting* (1978)
- SATCM, *Final Report of the SATCM I Meeting* (1977)
- SCAR and COMNAP, *Wildlife diseases*, SATCM XII WP 20 (2000).
- SCAR, *Exploring Subglacial Antarctic Lakes: A SCAR Report on Progress ATCM XXV IP 55* (2002)
- SCAR, *Hull fouling as a source of marine invasion in the Antarctic ATCM XXX, IP 37* (2007).
- SCAR, *SCAR's Environmental Code of Conduct for Terrestrial Field Research in Antarctica ATCM XXXII IP 04* (2009).
- SC-CAMLR, *Report of the IV SC-CCAMLR Meeting* (1985)
- SC-CAMLR, *Report of the Working Group on Ecosystem Monitoring and Management Report of the SC-CAMLR XXVII* (2009)
- SC-CCAMLR, *Report of the XXVII SC-CAMLR Meeting* (2008)
- SC-CCAMLR, *Report of the XXVIII SC-CAMLR Meeting* (2009)
- SC-CCAMLR, *Report of the XXV SC-CAMLR Meeting* (2006)
- Schachter, O., *International Law in Theory and Practice* (1991)
- Scott, K. N., 'Defending the world below the brine: Managing alien invasive species under the 2004 Ballast Water Convention – A New Zealand perspective', (2008) 14 *Journal of International Maritime Law* 308
- Scott, K. N., 'Institutional Developments within the Antarctic Treaty System' (2003) 52 *International Comparative Law Quarterly* 473
- Scott, K. N., 'International Regulation of Undersea Noise', (2004) 53 *International Comparative Law Quarterly* 287
- Scott, K. N., 'Liability for Environmental Damage in Antarctica: Annex VI to the Environmental Protocol on Liability Arising from Emergencies' (2006) 14(3) *Environmental Liability* 87
- Scott, S. V., *The Political Interpretations of Multilateral Treaties* (2004)
- Scott, S. V., 'How Cautious is Precautious? Antarctic Tourism and the Precautionary Principle. (2001) 50(4) *The International and Comparative Law Quarterly* 963
- Scovazzi, T., 'Marine Protected Areas on the High Seas: Some Legal and Policy Consideration,' 2004 *International Journal of Marine and Coastal Law* 19

- Scovazzi, T., 'Towards Guidelines for Antarctic Shipping: A Basis for Cooperation between the Antarctic treaty Consultative Parties and the IMO', in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- Scovazzi, T., and L. Pineschi, 'Environmental Impact Assessment for Scientific and Logistic Activities in Antarctica' in F. Francioni (ed.) *International Environmental Law for Antarctica* (1992)
- Segarra A. E., and S. R. Fletcher, 'Biosafety Protocol for Genetically Modified Organisms: Overview' in S. Elderidge (ed.), *Food Biotechnology: Current Issues and Perspectives* (2003)
- Sessions, G., 'Ecotourism, Wilderness, and Global Ecosystem Protection' in M. Oelschlaeger (ed.) *The Wilderness Condition* (1992)
- Shine C., N. Williams and G. Gündling, *A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species* (IUCN Environmental Policy and Law Paper No. 20, 2000)
- Showalter, S., and J. Savarese, 'The Existing US Legal Regime to Prevent the Hull Transport of Aquatic Invasive Species', A White Paper commissioned by the California Sea Grant Extension Program, September 2004, 9
- Simberloff, D., and B. V. Holle, 'Positive interactions of nonindigenous species: Invasional meltdown?' (1999) 1 *Biological Invasions* 21
- Skåre, M., 'Liability Annex or Annexes to the Environmental Protocol: A Review of the Process within the Antarctic Treaty System', in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- South Africa, *Propagule transport associated with logistic operations: a South African appraisal of a regional issue* ATCM XXXII WP 23 (2009).
- Sovacool, B. K., and K. E. Siman-Sovacool, 'Creating Legal Teeth for Toothfish: Using the Market to Protect Fish Stocks in Antarctica,' (2007) 20(1) *Journal of Environmental Law* 15
- Spletstoeser, J., 'IAATO's Stewardship of the Antarctic Environment: a History of Tour Operator's Concern for a Vulnerable Part of the World' (2000) 2 *International Journal of Tourism Research* 47
- Springer K, 'Macquarie Island – mammalian pests, past, present and future' (2006) 23 *Aliens* 14
- Stephens, T., 'The Japanese Whaling Case: Implications for Australia and Beyond,' (2008) 11 (3-4) *Asia Pacific Journal of International Law* 143.
- Stephens, T., and B. Boer, 'Enforcement and Compliance in the Australian Antarctic Territory: Legal and Policy Dilemmas,' in J. K. Kriwoken, J. Jabour and A. D. Hemmings (eds.), *Looking South: Australia's Antarctic Agenda* (2007)
- Stoeglehner, G., and G. Wegerer, 'The SEA-Directive and the SEA-Protocol adopted to spatial planning – similarities and differences' (2006) 26(6) *Environmental Impact Assessment Review* 586, 597.
- Stokke, O. S., and D. Vidas, 'Effectiveness and legitimacy of international regimes' in O. S. Stoke and D. Vidas (eds.) *Governing the Antarctic* (1996)
- Stokke, O. S., and D., Vidas, *Governing the Antarctic: The effectiveness and legitimacy of the Antarctic Treaty System* (1996)
- Subantarctic Marine Protection Planning Forum (NZ), *Implementation of the Protected Areas of the Territorial Seas of the Subantarctic Biogeographic Region of New Zealand: A Consultation Document* (2009) <<http://www.biodiversity.govt.nz/pdfs/seas/subantarctics-mpa-policy-consultation-document.pdf>> at 28 February 2010
- Summerson, R., and Riddle, M. J. 'Assessing Wilderness and Aesthetic Values in Antarctica' in W. Davison, C. H. Williams, and P. Broady (Eds.), *Antarctic Ecosystems: Models for Wider Ecological Understanding* (2000)
- Suter, K. D., *Antarctica: Private Property or Public Heritage* (1991)
- Sweden, France and New Zealand, *Report of the Antarctic Treaty inspections undertaken jointly by Sweden, France and New Zealand in accordance with Article VII of the Antarctic Treaty and Article 14 of the Protocol on Environmental Protection to the Antarctic Treaty* ATCM XXX WP 16 (2007)
- Tapper, R., (ed.), *User's Manual on the CBD Guidelines on Biodiversity and Tourism Development* (2007) <<http://www.cbd.int/doc/programmes/tourism/tourism-manual-en.pdf>> at 21 September 2009
- Tarassenko, S., 'Wastewater Treatment in Antarctica,' Supervised Project for Graduate Certificate in Antarctic Studies (2009); <http://www.anta.canterbury.ac.nz/documents/2008-09%20projects%20GCAS/Tarassenko.pdf> <accessed 02/01/10>
- Tavares, M., and G. A. S. de Melo, 'Discovery of the first known benthic invasive species in the Southern Ocean: the North Atlantic spider crab *Hyas araneus* found in the Antarctic Peninsula,' (2004) 16 *Antarctic Science* 129
- Thiel, H., 'Approaches to the Establishment of Protected areas on the High Seas', in A. Kirchner (ed.), *International Marine Environmental Law* (2003)

- Thompson, R. C. A., I. L. Owen, I. Puana, D. Banks, T. M. E. Davis, and S. A. Reid, 'Parasites and biosecurity – the example of Australia' in (2004) 19(9) *Trends in Parasitology* 410
- Tin, T., Z. L. Fleming, K. A. Hughes, D. G. Ainley, P. Convey, C. A. Moreno, S. Pfeiffer, J. Scott and I. Snape, 'Impacts of local human activities on the Antarctic Environment,' (2009) 21(1) *Antarctic Science* 3
- Touza, J., K. Dehnen-Schmutz, and G. Jones, 'Economic Analysis of Invasive Species Policies' in W. Nentwig (ed.) 193 *Biological Invasions* (2007), 353
- Tracey, P., 'Tourism Management on the Southern Oceanic Islands' in J. M. Snyder, and B. Stonehouse, (eds.) *Prospects for Polar Tourism* (2007)
- Treves, T., 'Compulsory Settlement of Disputes: A New Element of the Antarctic Treaty System' in F. Francioni (ed.) *International Environmental Law for Antarctica* (1992)
- Trouwborst, A., 'The Precautionary Principle in General International Law: Combating the Babylonian Confusion', (2007) 16 (2) *Review of European Community and International Environmental Law* 185
- UNEP WCMC, *Macquarie Island Commonwealth of Australia* (2008) <<http://www.unep-wcmc.org/sites/wh/pdf/MacQuarie%20Island.pdf>> at 21 September 2009
- UNEP, *Implementation of the GPA at regional level: The role of regional seas conventions and their protocols* (2006) < http://www.gpa.unep.org/documents/lbsa_protocols_for_the_english.pdf> at 29 April 2010
- UNEP-WCMC, *Preconditions for harmonising of reporting to biodiversity-related multilateral environmental agreements* (2009)
- UNESCO, *Operational Guidelines for the Implementation of the World Heritage Convention*, Annex II, WHC 81/01, January 2008
- UNESCO, *Report of the 21st Session of the World Heritage Committee*, WHC-07/31.COM/7B (1997)
- United Kingdom, *ASPA and ASMA management plans: review of provisions relating to NNS introductions* ATCM XXXII IP 12 (2009).
- United Kingdom, *Criteria for the selection of Marine Protected Areas* ATCM XXX IP 53 (2007)
- United Kingdom, *Enhancing Compliance with the Protocol: Departure state Jurisdiction* XXI ATCM WP 22 (1997)
- United Kingdom, *Polar Shipping Code* ATCM XXIII WP 40 (1999)
- United Kingdom, *Practical Guidelines for Ballast Water Exchange in the AT Area* ATCM XXIX WP 5 rev 1 (2006)
- United Kingdom, *Procedures for vehicle cleaning to prevent transfer of NNS into and around Antarctica* ATCM XXXII WP32 (2009)
- United Kingdom, *Proposals to improve the management and regulation of Antarctic tourism* ATCM XXVI WP 23 (2003)
- United Kingdom, *Proposed Construction and Operation of Halley VI Research Station, and Demolition and Removal of Halley V Research Station, Brunt Ice Shelf Antarctica* ATCM XXX IP 102 (2007)
- United Kingdom, *Review of provisions relating to NNS introductions in ASPA and ASMA management plans* ATCM XXXII WP 33 (2009)
- United Kingdom, *The Relationship between the Protocol on Environmental Protection to the Antarctic Treaty and Other International Agreements of a Global or Regional Scope* ATCM XX WP 10 (1996)
- United Nations General Assembly Records 60th Session, *Record of the 23rd meeting of the First Committee*, 1 November 2005. A/C.1/60/PV23
- United States *Report of Inspections* ATCM XXX IP 10 (2007)
- United States, *Executive Order Number 13112 on Invasive Alien Species*, pronounced by President Clinton, (1999)
- United States, *Team Report Of The Inspection Conducted In Accordance With Article VII Of The Antarctic Treaty And Article XIV Of The Protocol Under The Auspices of the United States Department of State* ATCM XXIV IP 17 (2001)
- Uruguay, *Medidas Previas para evitar la introduccion de especies alienas en la Antartida, en cumplimiento del Anexo II del Protocolo* ATCM XXXI IP 33 (2008)
- USA, *NNS Awareness Campaign: "Dont Pack a Pest" When Travelling to Antarctica* ATCM XXXI IP 93 rev. 1 (2008).
- USA, *Report on Exploration of Antarctic Subglacial Aquatic Environments; Environmental and Scientific Stewardship* ATCM XXXI, IP 110 (2008)
- Vicuña F O, 'The Regime of Antarctic Marine Living Resources' in F. Francioni and T. Scovazzi, *International law for Antarctica* (1996)
- Vicuña, F. O., 'Port State Jurisdiction in Antarctica: A New Approach to Inspection, Control and Enforcement' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- Vicuña, F. O., 'The effectiveness of the Protocol on Environmental Protection to the Antarctic Treaty' in O. S. Stoke and D. Vidas (eds.) *Governing the Antarctic* (1996)

- Vicuña, F. O., *Antarctic mineral exploitation: the emerging legal framework* (1988)
- Vicuña, F. O., 'The legitimacy of the Protocol on Environmental Protection to the Antarctic Treaty' in O. S. Stoke and D. Vidas (eds.) *Governing the Antarctic* (1996)
- Vidas, D., 'The Antarctic Continental Shelf Beyond 200 Miles: A Juridical Rubik's Cube' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- Vidas, D., and B. Njåstad, 'The ATS on the Web : Introducing Modern Information Technology in Antarctic Affairs' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- Vidas, D., 'Entry into Force of the Environmental Protocol and Implementation Issues' in D. Vidas (ed.), *Implementing the environmental protection regime for the Antarctic* (2000)
- Vidas, D., 'The Antarctic Treaty System and the law of the sea: a new dimension introduced by the Protocol,' in O. S. Stoke and D. Vidas (eds.) *Governing the Antarctic* (1996)
- Vidas, D., 'The Antarctic Treaty System in the international community: an overview' in O. S. Stoke and D. Vidas (eds.) *Governing the Antarctic* (1996)
- Vigni, P., 'Antarctic Maritime Claims: "Frozen Sovereignty" and the Law of the Sea' in A. G. Oude Elferink, and D. R. Rothwell (eds.), *The Law of the Sea and Polar Maritime Delimitation and Jurisdiction* (2001)
- Vigni, P., 'The Secretariat of the Antarctic Treaty: achievements and weaknesses three years after its establishment' in G. Triggs, and A. Riddell, *Prospects for Polar Tourism* (2007)
- Vukas, B., and Vidas, D., 'Flags of Convenience and High Seas Fishing: The Emergence of a Legal Framework', in O. S. Stoke *Governing High Seas Fisheries: The Interplay of Global and Regional Regimes* (2001).
- W A Polk, 'Welcome to the Hotel Antarctica: The EPA's Interim Rule on Environmental Impact Assessment of Tourism In Antarctica,' (1998) 12 *Emory International Law Review* 1421
- Watts, A. D., *International Law and the Antarctic Treaty System* (1992)
- Watts, A., D., 'The Antarctic Treaty as a Conflict Resolution Mechanism' in Polar Reserve Board, National Research Council (ed.) *Antarctic Treaty System: An Assessment* (1986)
- Westbrook, C., and K. Ramos, *Under Siege: Invasive Species on Military Bases, National Wildlife Federation Report* (2005)
- Whinam J, Chilcott N, and Bergstrom D M, 'Subantarctic hitchhikers: expeditioners as vectors for the introduction of alien organisms,' (2005) 121 *Biological Conservation* 207
- Wilkinson, A., and D. Farr, *AQIS and MAFBNZ Schedule of Aircraft Disinsection Procedures*, (Version 2.0, 2009)
- Williams, R., and K. Crosbie, 'Antarctic Whales and Antarctic Tourism,' (2007) 4 *Tourism in Marine Environments* 2
- Wilson, E. O., *The Diversity of Life* (1992)
- Wittenberg, R., and M. J. W. Cock (ed.) *Invasive Alien Species: A Toolkit of Best Prevention and Management Practices* CAB International (2001)
- Wood, K. R., 'The Uncertain Fate of the Madrid Protocol to the Antarctic Treaty in the Maritime Area' (2003) 34 *Ocean Development and International Law* 139
- World Tourism Organisation, *Global Code of Ethics for Tourism* (2004), Article 3(4)
<http://www.unwto.org/ethics/full_text/en/pdf/Codigo_Etico_Ing.pdf> at 20 September 2009
- Worner S P, 'Tools for Risk Assessment and Management of Non-native Species', in M. Rogan-Finnemore (ed.), *Non-Native Species in the Antarctic Proceedings* (2008)
- Wyrozumska, A., 'Erga tertios effect of the Antarctic Treaty' (1993) 6 *Antarctic and Southern Ocean law and policy occasional paper* 1
- Y Kakasabe, *The Antarctic Protected Areas System: Challenges and practice* (A key note address at the second Antarctic Protected Areas Workshop, Lima, Peru, 22-23 May 1999)
- Zovko, I., 'Vessel-sourced pollution in the Southern Ocean: benefits and shortcomings of regional regulation' in G. Triggs, and A. Riddell, *Prospects for Polar Tourism* (2007)

2. CASE LAW

- Case concerning Military and Paramilitary Activities In and Against Nicaragua (Nicaragua v United States of America)* [1986] International Court of Justice Report 111 [123]
- Case Concerning the Gabčíkovo-Nagymaros Project (Hungary v Slovakia)* [1997] International Court of Justice Reports 7
- Humane Society International Inc v Kyodo Senpaku Kaisha Ltd* (2008) FCA 3
- New Zealand; Sellers v Maritime Safety Inspector*, Case no. CA104/98, Judgement of 5 November 1998

The Camouco Case (Seychelles v France) Application for Prompt Release (2000) ITLOS Case No. 5
The Grand Prince Case (Belize v France) Application for Prompt Release (2001) ITLOS Case No. 8
The Monte Confurco (Panama v France) Application for Prompt Release (2000) ITLOS Case No. 6
The Volna Case (Russian Federation v Australia) (2002) ITLOS Case No. 11

3. DOMESTIC LEGISLATION/REGULATIONS

3.1. NEW ZEALAND

3.1.1. LEGISLATION

Antarctic (Environmental Protection) Act 1994
Antarctic Marine Living Resources Act 1981
Antarctic Treaty Act 1960
Biosecurity Act 1993
Conservation Act 1987
Hazardous Substances and New Organisms Act 1999
Imperial Laws Application Act 1988
Marine Mammal Protection Act 1978
Marine Reserves Act 1971
Maritime Transport Act 1994
New Zealand Antarctic Institute Act 1996 (NZ)
Reserves Act 1977
Territorial Sea, Contiguous Zone and Exclusive Economic Zone Act 1977

3.1.2. REGULATIONS AND GUIDELINES

ANZ, *Biosecurity and Non-native species Health, Safety and Environment Policy 7* (2009)
ANZ, *Environmental Code of Conduct* (2004)
<<http://www.antarcticanz.govt.nz/downloads/environment/Codeconduct.pdf>> at 10 August 2009
ANZ, *Waste Management Handbook* (2007)
<http://www.antarcticanz.govt.nz/downloads/environment/Waste_Manual0708LR.pdf> at 12 August 2009
D Agnew, A Roberts and G Harper, *Island Biosecurity Plan: Southland Conservancy DOC* (2008)
DOC and MFish (NZ) *Marine Protected Areas: Classification, Protection Standard and Implementation Guidelines* (2008) <<http://www.biodiversity.govt.nz/pdfs/seas/MPA-classification-protection-standard.pdf>> at 2 October 2009
DOC, *Subantarctic Expeditions: Operational Procedures for Management and Research Expeditions in the New Zealand Sub-Antarctic* (2008) docDM-227148
Fisheries (High Sea Fishing Notifications – Commission for the Conservation of Antarctic Marine Living Resources) Notice 2009
MAFBNZ, *Import Health Certificate for Ballast Water*, Issued pursuant to Biosecurity Act 1993, Section 22 (2005)
MAFBNZ, *Importing Antarctic Fish*, issued pursuant to Section 22 Biosecurity Act 1993 (2007)
Marine Protection Rules Part 160: Prevention of Pollution by Sewage by Ships in the Antarctic Treaty Area Marine Reserve (Auckland Islands – Motu Maha) Order 2003 (SR 2003/389)
Maritime Protection Rules, Part 160-Prevention of Pollution by Sewage from Ships in the Antarctic Treaty Area (Effective 20 August 1998)
Memorandum of Understanding on biosecurity activities between Ministry of Agriculture and Forestry and Department of Conservation, Ministry of Fisheries, and Ministry of Health, 31 October 2006 (2006)

3.2 AUSTRALIA

Antarctic Marine Living Resources Conservation Act (1981)
Antarctic Science, Tourism and Conservation Act (1996)
Antarctic Treaty Act 1960
Australian Antarctic Territory Acceptance Act (1933)
Australian Antarctic Territory Act (1954)
Ballast Water Research and Development Funding Levy Collection Act (1998)
Environmental Protection and Biodiversity Conservation Act (1999)
Environmental Protection Management Ordinance (1987)
Fisheries Management Act 1991
Legislation Act 2001
National Parks and Reserves Management Act 2002 (Tasmania)
Protection of the Sea (Pollution from Ships) Act 1983
Quarantine Act 1908
Sea and Submerged Lands Act 1973

AAD, *AAD Draft Response Plan for the Discovery of Unusual Animal Deaths* (2003)
 [<http://www.aad.gov.au/MediaLibrary/asset/Medialtems/ml_3775755333333333_Unusual%20Mortality%20Response%20Plan.pdf>](http://www.aad.gov.au/MediaLibrary/asset/Medialtems/ml_3775755333333333_Unusual%20Mortality%20Response%20Plan.pdf) at 10 August 2009

AAD, *Australia's Antarctic Tourism Policy* (2004), [<http://www.aad.gov.au/default.asp?casid=20909>](http://www.aad.gov.au/default.asp?casid=20909) at 23 November 2009;

AAD, *Heard Island and McDonald Islands Marine Reserve Management Plan* (2005)

Antarctic Marine Living Resources Conservation Regulations 1994

Antarctic Treaty (Environment Protection) (Waste Management) Regulations (1994)

Antarctic Treaty (Environmental Protection) (EIA) Regulations 1993

AQIS, *AQIS Arrangements for Aircraft Invoking Sovereign Immunity* (2008)

AQIS, *Australian Ballast Water Requirements* (Version 4, 2008)

AQIS, *Cleaning Instructions – Personal Equipment* (2004)

AQIS, *Foreign Military Equipment and Personnel; Guidelines for Offshore Inspection* (2008)

DEHWA (Australia), *Significant Impact Guidelines: Matters of National Environmental Significance* (2006) EPBC Act Policy Statement 1.1

DEHWA, *Interim Management Arrangements for Macquarie Island Commonwealth Marine Reserve issued under Section 359(b) of the EPBC Act 1999* (2008)
 [<http://www.environment.gov.au/coasts/mpa/southeast/macquarie/management.html>](http://www.environment.gov.au/coasts/mpa/southeast/macquarie/management.html) at 28 October 2009

DEHWA, *Recovery Plan for Albatrosses and Giant Petrels* (2001)

DEHWA, *Research and Monitoring Plan for the Macquarie Island Marine Park* (Under Review, 2001)

DEHWA, *The Threat Abatement Plan for Competition and Land Degradation by Feral Rabbits* (2008) and
DEHWA, The Threat Abatement Plan for Predication by Feral Cats (2008);
Environmental Protection (Ship's Ballast Waters) Regulations 2006 (Victoria, Australia)

Fisheries Management (Macquarie Island Toothfish Fishery) Regulations 2006, Selective Legislative Instrument 2006 No. 255

MFish, *Strategy for Managing the Environmental Effects of Fishing* (2005),
 [<http://www.fish.govt.nz/NR/rdonlyres/B341907D-D284-4E3D-BC19-9628D3301902/1505/SMEFFPapa2.pdf>](http://www.fish.govt.nz/NR/rdonlyres/B341907D-D284-4E3D-BC19-9628D3301902/1505/SMEFFPapa2.pdf) at 5 December 2009

Proclamation under the Seas and Submerged Lands Act 1973, Commonwealth of Australia Gazette (Special), No. S290, Friday, 29 July 1994 (1994)
Service Level Agreement between the Director of National Parks (Commonwealth) and the Crown represented by the Department of Tourism, Parks, Heritage and the Arts (Tasmania), made on the 11th January 2005
Tasmanian Parks and Wildlife Service, *Guidelines for Tourist Operations and Visits to Macquarie Island and Nature Reserve and World Heritage Area* (2009)
Tasmanian Parks and Wildlife Service, *Macquarie Island Nature Reserve and World Heritage Area Management Plan 2006* (2006)
Territorial Sea, Contiguous Zone and Exclusive Economic Zone Act 1977 Commencement Orders (1997, 1998)

3.3 OTHER

Law no 22.351 (1980) (Argentina)
National Environmental Policy Act 1970 42 U.S.C. § 4321 (United States)
United States, *Executive Order Number 13112 on Invasive Alien Species* pronounced by President Clinton, (1999)

4. INTERNATIONAL INSTRUMENTS

4.1 TREATIES

- Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing*, opened for signature 22 November 2009. FAO Tre-154601 (not in force).
- Agreement on the Application of Sanitary and Phytosanitary Measures*, opened for signature 15 December 1993 GATT Doc. MTN/FA II-AIA-4 (entered into force 1 January 1995)
- Agreement on the Conservation of Albatrosses and Petrels*, opened for signature 19 May 2004. 2258 *United Nations Treaty Series* 257 (entered into force 1 February 2004).
- Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas*, opened for signature 29 November 1993. FAO TRE-001183 (entered into force 24 April 2003).
- Convention concerning the protection of the World Cultural and Natural Heritage*, opened for signature 16 November 1972, 1037 *United Nations Treaty Series* 151 (entered into force 17 December 1975)
- Convention on Biological Diversity*, opened for signature 5 June 1992. 1760 *United Nations Treaty Series* 79 (entered into force 29 December 1993)
- Convention on Environmental Impact Assessment in a Transboundary Context*, opened for signature 25 February 1991. 1989 *United Nations Treaty Series* 309 (entered into force 10 September 1997)
- Convention on International Civil Aviation*, opened for signature 7 December 1944. 15 *United Nations Treaty Series* (entered into force 4 April 1947)
- Convention on the Conservation of Antarctic Marine Living Resources*, opened for signature on 20 May 1980, 19 *International Legal Materials* (1980) (entered into force 7 April 1982)
- Convention on the Conservation of Antarctic Seals*, opened for signature on 1 June 1972, 29 UST 441 (entered into force March 11 1978)
- Convention on the Regulation of Antarctic Mineral Resource Activity* (opened for signature on 25 November 1988, 27 *International Legal Materials* (1988) (not in force) ('CRAMRA')
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat*, opened for signature 21 December 1975. 996 *United Nations Treaty Series* 245 (entered into force 21 December 1975)
- International Convention for the Prevention of Pollution from Ships*, opened for signature 2 November 1973 as modified by the 1978 Protocol opened, for signature 26 November 1983 and as regularly amended. 1340 *United Nations Treaty Series* 61 (entered into force 2 October 1983) ('MARPOL 73/78')
- International Convention for the Regulation of Whaling*, opened for signature 2 December 1946. 161 *United Nations Treaty Series* 72 (entered into force 10 November 1948)
- International Convention for the Safety of Life at Sea*, opened for signature 1 November 1974 as amended. 1184 *United Nations Treaty Series* 278 (entered into force 25 May 1980)
- International Convention for the Safety of Life at Sea*, opened for signature 1 November 1974 as amended. 1184 *United Nations Treaty Series* 278 (entered into force 25 May 1980)
- International Plant Protection Convention*, 17 November 1997. 2367 *United Nations Treaty Series* (entered into force 2 October 2005)
- Protocol on Environmental Protection to the Antarctic Treaty*, opened for signature 4 October 1991. 30 *International Legal Materials* 1455 (entered into force 14 January 1998)
- Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context*, opened for signature 21 May 2003. S Marsden, *Strategic Environmental Assessment in International and European Law: A Practitioners Guide*, 287 (not in force)
- The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks 1995*, opened for signature 4 August 1995, 34 *International Legal Materials* 1542 (entered into force 11 December 2001) ('FSA')
- The Antarctic Treaty*, opened for signature 1 December 1959. 402 *United Nations Treaty Series* 71 (entered into force 23 June 1961).
- Treaty between the Government of Australia and the Government of the French Republic on Cooperation in the Maritime Areas Adjacent to the French Southern and Antarctic Territories, Heard Island and the*

McDonald Islands signed on 24 November 2003. 2438 *United Nations Treaty Series* (entered into force 1 February 2005)
Vienna Convention on the Law of Treaties, opened for signature 23 May 1969. 1155 *United Nations Treaty Series* 331 (entered into force 27 January 1980)

4.2 SECONDARY INSTRUMENTS UNDER THE ATS

Agreed measures for the Conservation of Antarctic Flora and Fauna, attached to Recommendation III-VIII adopted at ATCM III, opened for signature June 2 1964 (entered into force 1 November 1982)
ATCM, *Electronic Information Exchange System* ATCM XVIII Decision 10 (2005)
ATCM, *Revised Environmental Impact Guidelines* ATCM XXVIII Recommendation 4 (2005)
ATCM, *Revised Management Plan for ASPA No. 150 Ardley Island, Maxwell Bay, King George Island, WP 25* ATCM XXX (2007)
ATCM, *Revised Rules of Procedure*, ATCM XXXI Decision 1(Annex) (2008)
ATCM, *Site Guidelines for Visitors*, ATCM XXVIII Resolution 5 (2005)
ATCM, *Support for the Catch Documentation Scheme* ATCM XXIV Resolution 2 (2001)
ATCM, *Support for the Catch Documentation Scheme* ATCM XXIV Resolution 2 (2000)
ATCM, *The Practical Guidelines for Ballast Water Exchange in the AT Area* ATCM XXIX Resolution 2 (2006)
ATCM, *Amendment of Annex II to the Environmental Protocol* ATCM XXXII Measure 16 (2009)
ATCM, *Antarctic Inspection Checklist* ATCM XIX Resolution 5 (2006)
ATCM, *Ballast Water Exchange – Referral to IMO* ATCM XXIX Decision 2 (2006)
ATCM, *Checklist to assist in the inspection of ASPA and ASMA* ATCM XXXI Attached to Resolution 4(2008)
ATCM, *Combating illegal, unreported and unregulated fishing in the Convention Area by the flag vessels of non-Contracting Parties* CCAMLR Resolution 25/XXV
ATCM, *COMNAP Practical Guidelines for Developing and Designing Environmental Monitoring Programmes in Antarctica* ATCM XXVII Resolution 2 (2005)
ATCM, *Electronic Information Exchange System: Start of Operations* ATCM XXXI Decision 5 (2008)
ATCM, *Enhancement of Environmental Protection up to the Antarctic Convergence* ATCM XXXII Resolution 1 (2009).
ATCM, *Environmental Domains Analysis for the Antarctic continent as a dynamic model for a systematic environmental geographic framework* ATCM XXXI Resolution 3 (2008) (EDA Resolution)
ATCM, *General Principles of Antarctic Tourism* ATCM XXXII Resolution 7 (2009)
ATCM, *Guide to Preparation of Management Plans for Antarctic Specially Protected Areas* ATCM XII Resolution 2 (1998)
ATCM, *Guidelines for CEP Consideration of New and Revised Draft ASPA and ASMA Management Plans* CEP VI, Annex 4 (2003)
ATCM, *Guidelines for Implementation of the Framework for Protected Areas* ATCM SXII Resolution 1 (2001)
ATCM, *Guidelines for the implementation of the framework of protected areas set forth in Article 3, Annex V of the Environmental Protocol* ATCM XXII Resolution 1 (2000)
ATCM, *Guidelines for the implementation of the framework of protected areas set forth in Article 3, Annex V of the Environmental Protocol* ATCM XXII Resolution 1 (2000)
ATCM, *Guidelines for Visitors to the Antarctic* ATCM XVIII Recommendation 1 (1994)
ATCM, *Guidelines on contingency planning, insurance and other matters for tourist and non-governmental activities in the Antarctic Treaty area* ATCM XVII Resolution 4 ATCM (2004)
ATCM, *Information Exchange Requirements*, ATCM XXVI Appendix 4 (2001)
ATCM, *Insurance and Contingency Planning for Tourism and Non-Governmental Activities in the Antarctic Treaty area* ATCM XXVII Measure 4 (2004) (not yet effective)
ATCM, *Landing of Persons from Passenger Vessels* ATCM XXXII Measure 15 (2009)
ATCM, *Management plan for ASPA No. 104, Sabrina Island, Northern Ross Sea* ATCM XXXII Measure 3 (2009)
ATCM, *Management Plan for ASPA No. 132: Potter Peninsula, King George Island (Isla 25 De Mayo), South Shetland Islands* ATCM XIII Measure 2 (1985)
ATCM, *Marine Protected Areas* ATCM XXVIII, Decision 9 (2005)
ATCM, *Post Visit Site Report Form* ATCM XXVIII Resolution 5 (2005)
ATCM, *Provisional application of the Secretariat Measure* ATCM XXVI Decision 1 (2003)
ATCM, *Secretariat of the Antarctic Treaty* ATCM XXVI Measure 1 (2003)

ATCM, *Shipping Code* ATCM XXXII Resolution 8 (2009)
 ATCM, *The work of CCAMLR on MPA* ATCM XXIX WP 7 (2006)
 CCAMLR, *Scheme to promote compliance by non-Contracting Party vessels with CCAMLR conservation measures* CM 10-07 (2009)
 CCAMLR, *Automated satellite-linked Vessel Monitoring Systems* CM 10-04 (2007)
 CCAMLR, *Catch Documentation Scheme for Dissostichus spp.* CM 10-05 (2008)
 CCAMLR, *General environmental protection during fishing* CM 26-01 (2009)
 CCAMLR, *Port inspections of vessels carrying toothfish* CM 10-03 (2009)
 CCAMLR, *Procedure for according protection to CEMP sites* CM 91-01 (2004)
 CCAMLR, *Protection of the South Orkney Islands south shelf* CM 91-03 (2009)
 CEP, *Procedures for intersessional CEP consideration of draft CEEs* CEP X Appendix 1 (2007).

4.3 SECONDARY INSTRUMENTS UNDER THE IMO

IMO, *Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas* (29 November 2001)
 IMO Doc Assembly Res. A.22/927
 IMO, *Voluntary Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens* (27 November 1997) IMO Res. A.868(20)
 MEPC, *General Provisions on Ships' Routeing*, IMO Resolution A.572(14) (adopted 20th November 1985), as amended by Resolution MSC.280(85), (adopted 1 December 2008)
 MEPC, *Guidelines for Additional Measures Regarding Ballast Water Management Including Emergency Situations* (G13) IMO Resolution MEPC. 161(56) (2007)
 MEPC, *Guidelines for Approval and Oversight of Prototype Ballast Water Treatment Technology Programmes* (G10) MEPC 42/WP.1 Annex 2 (2006).
 MEPC, *Guidelines for Ballast Water Exchange in the Antarctic Treaty Area*, Resolution MEPC.163(56) (2007)
 MEPC, *Guidelines for Sediment Reception facilities*(G1), Resolution MEPC.152 (55) (2006)
 MEPC, *Report of the MEPC Committee, 59th session 13-17 July 2009* <
http://www.imo.org/newsroom/mainframe.asp?topic_id=109&doc_id=11123>
 MEPC, *List of ballast water management systems that make use of Active Substances which received Basic and Final Approvals BWM.2/Circ.23* (24 September 2009)
 MEPC, *Revised Guidelines on implementation of effluent standards and performance tests for sewage treatment plans* Resolution MEPC.159(55) (2006)
 MEPC, *Revised Guidelines for the Identification and Designation of PSSAs* Resolution A.982(24) XXIV IMO (2005)
 MEPC, *Designation of the Canary Islands as a Particularly Sensitive Sea Area* MEPC.134(53) (2005)
 SOLAS, *Ships Routeing, Regulation* SOLAS V/10(1)

4.4 SECONDARY INSTRUMENTS UNDER THE CBD

CBD COP, *Guiding Principles for the Implementation of Article 8(h)* Decision VI/23 (2002)
 CBD COP, *Clearing-House mechanism for technical and scientific cooperation* Decision I/3 (1994)
 CBD COP, *Alien species that threaten ecosystems, habitats or species* (Article 8 (h)) Decision VII/13 (2004)
 CBD COP, *Alien species that threaten ecosystems, habitats and species* Decision VIII/27 (2006)
 CBD COP, *Alien species that threaten ecosystems, habitats or species* Decision VI/23 (2002)
 CBD COP, *Biological Diversity and Tourism* Decision VII/14 (2004)
 CBD COP, *Conservation and sustainable use of marine and coastal biological diversity, including a programme of work*, Decision VII/5 (2004)
 CBD COP, *Conservation and sustainable use of marine biological diversity* Decision II/10 (1995), Annex II
 CBD COP, *Guidelines on Biodiversity and Tourism Development*, Decision V/25 (2000)
 CBD COP, *Protected areas* (Articles 8(a) to (e)) Decision VII/28 (2004)
 CBD COP, *Protected Areas* Decision IX/18(9)
 CBD COP, *Alien species that threaten ecosystems, habitats or species* CBD COP Decision VIII/27 (2006)
 CBD COP, *Alien species that threaten ecosystems, habitats or species*, CBD COP Decision VI/23 (2002)

CBD COP, *Draft guidance on biodiversity-inclusive SEA, in Background Document on Voluntary Guidelines on Biodiversity-Inclusive Impact Assessment*, CBD COP Decision VIII/28 (2006)

CBD, *Draft guidance on biodiversity-inclusive SEA, in Background Document on Voluntary Guidelines on Biodiversity-Inclusive Impact Assessment* CBD COP Decision VIII/28 (2006).

CBD, *Liability and Redress* Decision IX/23 (2008)

CBD COP, *Scientific Criteria for Identifying Ecologically or Biologically Significant Marine Areas in Need of Protection in Open-Ocean Waters and Deep-Sea Habitats*, Annex to Decision IX/20 (2008)

4.5 OTHER

ANZECC, Code of Practice for Anti-Fouling and In-water Hull Cleaning and Maintenance, (1997)
<<http://www.environment.gov.au/coasts/pollution/antifouling/code/pubs/code.pdf>> at 19 September 2009

European Community, Council Directive 95/21/EC of 19 June 1995 concerning the enforcement, in respect of shipping using Community ports and sailing in the waters under the jurisdiction of the Member States, of international standards for ship safety, pollution prevention and shipboard living and working conditions (port State control) (1995) Official Journal L 157

European Community, *Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage* (2004) Official Journal L 143

FAO, *FAO Code of Conduct for Responsible Fisheries* (adopted 31 October 1995)

FAO, *International Plan of Action to Prevent, Deter and Eliminate, Illegal, Unreported and Unregulated Fishing, adopted by consensus by the Food and Agriculture Organization Committee on Fisheries on 2 March 2001 and endorsed by the FAO Council on 23 June 2001* (2001)

ICAO, *Implementation of Resolution A35-19: Preventing the Introduction of Invasive Alien Species* Resolution A36-WP/19 EC/4 (2007)

ICAO, *Non-chemical disinsection of the aircraft cabin and flight deck for international flights* Resolution A36-24 (2007).

ICAO, *Non-chemical disinsection of the aircraft cabin and flight deck for international flights* Resolution A36-24 (2007)

Memorandum of Understanding on biosecurity activities between Ministry of Agriculture and Forestry and Department of Conservation, Ministry of Fisheries, and Ministry of Health, 31 October 2006 (2006)

Ramsar Convention COP, *Invasive Species and Wetlands* Resolution VII(14) (1999)

UNEP, *Global Programme of Action for the Protection of the Marine Environment from Land-based Activities* UNEP(OCA)/LBA/IG.2/7, (1995) ('GPA')

UNEP, *Washington Declaration for the Protection of the Marine Environment from Land-based Activities* (signed on 1 November 1995)

UNESCO, *Operational Guidelines for the Implementation of the World Heritage Convention*, Annex II, WHC, 81/01, (2008)

United Nations General Assembly *United Nations General Assembly Resolution 61/105* (2006), OP83

5. OTHER SOURCES

AAD, 'Flight Schedule for Season 2009/10', <<http://its-db.aad.gov.au/proms/public/schedules/flight.cfm?season=0910>> at 4 April 2010.

AAD, 'Shipping Schedule for Season 2009/10', <<http://its-db.aad.gov.au/proms/public/schedules/flight.cfm?season=0910>> at 10 April 2010;

AAD, Approved Science Projects for the season 2008/9 (2010), <http://its-db.aad.gov.au/proms/public/projects/projects_by_program.cfm?season=0809&PG_ID=7> at 2 July 2010

AAD, Australian Guidelines for preparation of IEEs and CEEs,
<<http://www.aad.gov.au/default.asp?casid=12307>> at 05 August 2009.

AAD, *EIA Form* (Version 2, 2008)

AAD, *Environmental approvals for tour and expedition* (2004)
 <<http://www.aad.gov.au/default.asp?casid=20918>> at 2 December 2009

AAD, *Shipping Schedule for Season 2009/10, Voyage 4 – Ship: Aurora Australis (25-Sep-2009)*, <<http://its-db.aad.gov.au/proms/public/schedules/voyage.cfm?season=0910#V4>> at 25 November 2009

AAD, *Waste Management* (2009) <<http://www.aad.gov.au/default.asp?casid=755>> at 12 August 2009

AFMA, *Macquarie Island Fisheries: At a Glance* (2009)
 <http://www.afma.gov.au/fisheries/antarctic/macquarie/at_a_glance.htm> at 1 October 2009

AFMA, *Summary of management, environmental, and research measures in place for Australian operators in sub-Antarctic waters* (2009)
 <http://www.afma.gov.au/fisheries/antarctic/publications/Summary_measures_20090430.pdf> at 6 December 2009

Antarctica New Zealand, *Environmental Legislation applying to New Zealanders in Antarctica* (2010) <
<http://www.antarcticanz.govt.nz/images/downloads/environment/may%202010%20nzlegislation.pdf>>
 at 2 January 2010

ANZ, IEE: *Development, Management and Execution of New Zealand Antarctic Programme 2008/09 ATS EIA Database* (2009)
 <<http://www.ats.aq/documents/EIA/01084enInitial%20Environmental%20Evaluation%20AntNZ%200809%20-%20ex%20appendices.pdf>> at 10 July 2009.

ANZ, *Waste Management and Remediation* (2007) <<http://www.antarcticanz.govt.nz/environment/2592>> at 12 August 2009

AT Secretariat, *List of Inspections under Article VII of the Antarctic Treaty and Article 14 of the Protocol on Environmental Protection* (2009)
 < http://www.ats.aq/e/ats_governance_listinspections.htm> at 12 November 2009.

Australian Maritime Safety Authority, *PSSA Fact Sheet* (2009) Table 1-Designated PSSA's,
 <http://www.amsa.gov.au/publications/fact_sheets/psa_fact.pdf> at 1 March 2010

CBD Secretariat, *Invasive Alien Species Portal/Guidance and Tools* (April 2009),
 <<http://www.cbd.int/invasive/tools.shtml>> at 10 April 2010.

CBD, *National Reports Analyser* (2010) <<http://www.cbd.int/reports/analyzer.shtml>> at 26 July 2010

CCAMLR, *Details of Fishing Licences/Permits* (2010) < <http://www.ccamlr.org/pu/e/sc/fish-monit/vess-licensed.htm>> at 1 July 2010

Chape, S., S. Blyth, L. Fish, P. Fox and M. Spalding, *2003 United Nations List of Protected Areas, IUCN and UNEP-WCMC* (2003), < http://www.unep-wcmc.org/wdpa/unlist/2003_UN_LIST.pdf> at 10 June 2010.

Commission on the Limits of the Continental Shelf Web Portal,
 <http://www.un.org/Depts/los/clcs_new/clcs_home.htm>, at 10 September 2009

McIntyre, D., M. McIntyre and A. Broadbent, *Initial Environmental Evaluation (IEE) - Australian Non-Government Operations in Antarctica "MV Orion" (2008/09)* (2008)
 Email from James Walker, Antarctic Policy Unit, MFAT to Andrew Phillips, 28 April 2009

DEHWA, EPBC Act – Environment Assessment Process, (2007),
 <<http://www.environment.gov.au/epbc/publications/pubs/assessment-process.pdf>> Accessed 10/10/2009

Department of Infrastructure, Transport and Regional Development and Local Government (Australia), *Ballast Water Management (2008)* <<http://www.infrastructure.gov.au/maritime/environment/ballast.aspx>> at 4 November 2009

DEHWA, DEHWA Service Charter, 2009-2012 (2009)
 <<http://www.environment.gov.au/about/publications/pubs/dewha-service-charter-2009-12.pdf>> at 4 July 2010

DOC Southland Conservation Board, Minutes of a meeting of the Southland Conservation Board held on Tuesday 26 February 2008; <<http://www.doc.govt.nz/upload/documents/getting-involved/nz-conservation-authority-and-boards/conservation-boards-by-region/southland/southland-board-mins-feb08.pdf>> at 15 October 2009

DOC, *Entry to Nature Reserve/Scenic Reserve/Special Area Application Form/Permit*, docDM-504763

DOC, *Sub Antarctic Vessel Inspection Certificate*, DOCDM-229518 (2008)

DOC, *Minutes of a Meeting of the Southland Conservancy Board Held on Saturday 14 February 2009* (2009)
 <<http://www.doc.govt.nz/upload/documents/getting-involved/nz-conservation-authority-and-boards/conservation-boards-by-region/southland/scb-minutes-feb-09.pdf>> at 29 November 2009

DOC, *Sub Antarctic Vessel Inspection Certificate*, DOCDM-229518 (2008).

Email from Ben Sims, International Adviser, MFish (NZ), 16 April 2010

Email from Jana Newman (Environmental Advisor, Antarctica New Zealand) to Andrew Phillips, 13 May 2009

Email from Kerry Steinberger, Environmental Officer, AAD to Andrew Phillips (9 August 2009)

Email from Peter McClelland, Senior Conservation Officer, DOC to Andrew Phillips (23 November 2009)

Goff, P., *New Zealand Policy Statement on Tourism and Other Non-Governmental Activities in Antarctica* MFAT (2009), <<http://www.beehive.govt.nz/node/16901>> at 23 November 2009

IAATO, *Guidelines: Tour Operators* <<http://www.iaato.org/guidelines.html>> at 3 July 2010

IAATO, *IAATO membership database* (2009) <<http://apps.iaato.org/iaato/directory/list.faces;jsessionid=B96F410AAC938AE93D828059EA387CC5.iaato2>> at 28 November 2009

IAATO, *Post-Visit Report Form: Part 2 – Site Visit Record* <http://www.iaato.org/docs/PVR_PC08.xls> at 1 July 2009

Interview with Neil Gilbert, Environmental Manager, ANZ (ANZ, International Antarctic Centre, 11 April 2009)

IUCN, *Guidelines for Protected Areas Management Categories* (1994) <http://www.unep-wcmc.org/protected_areas/categories/eng/index.html> at 13 March 2009

MAFBNZ, *Clean Boats-Living Seas (2008)* <<http://www.biosecurity.govt.nz/files/enter/ships/clean-boats-brochure.pdf>> in 20 August 2009

MFAT, *New Zealand Procedures for Antarctic Tourists and Other Non-Governmental Activities* (2009) <<http://www.mfat.govt.nz/Foreign-Relations/Antarctica/3-New-Zealand-Procedures-for-Visitors-to-Antarctica/index.php>> at 3 December 2009

Statement by the Chairman of the Conference on the Conservation of Antarctic Marine Resources on 19 May 1980, (1980) <http://www.ccamlr.org/pu/e/e_pubs/bd/pt1.pdf> at 2 June 2009

UNEP, Implementation of the GPA at regional level: The role of regional seas conventions and their protocols (2006) <http://www.gpa.unep.org/documents/lbsa_protocols_for_the_english.pdf> at 29 April 2010

WCPA, *Application of IUCN Protected Area Management Categories: Draft Australian Handbook* (2000) <http://www.unep-wcmc.org/protected_areas/categories/australia.pdf> at 4 March 2010

APPENDIX 1

SUMMARY OF SUBMISSIONS TO COMMITTEE FOR ENVIRONMENTAL PROTECTION ON NON-NATIVE SPECIES

KEY:

Categories based on C Shine, N Williams and L Gündling, 'A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species,' IUCN Environmental Policy and Law Paper No. 40 (2000).

Risk Assessment: The identifying the risk involved with non native species or risks surrounding particular activities.

Education: Disseminating information about Antarctic NNS and biosecurity responsibilities and best practise to actors likely to interact with the Antarctic environment.

Surveillance: Developing a baseline of NNS in the Antarctic, monitoring for NNS and communicating the results of monitoring to other AT Parties.

Structure: Describing or addressing the systemic or strategic treatment of NNS in the ATS.

Response: Describing or addressing biosecurity response measures.

Quarantine: Measures preventing or reducing the risks of NNS entering a geographic area (terrestrial environment unless indicated otherwise).

Marine: Quarantine specific to the marine environment.

Protected areas: Quarantine specific to protected areas.

SOURCE:

AT Secretariat, *Topic Summary of CEP discussions on Non-native species (NNS) in Antarctica* ATCM XXXII SP11 (2009).
IPs and WPs to the CEP on subject of NNS.

TABLE 1: SUBMISSIONS TO THE CEP ON NNS (1998-2006)

Year (CEP)	State/NGO	Submission	Category	Practical Consequences
1998 (CEP I)	Australia	Introduction of Diseases to Antarctic Wildlife: Proposed Workshop (IP 4)	Risk assessment	[WP 32 (CEP II)]
1998 (CEP I)	IUCN	Introduction of NNS in the Antarctic area: An increasing problem (IP 53)	Risk assessment	NNS priority for the CEP.
1999 (CEP II)	Australia	Report to ATCM XXIII on outcomes from the Workshop on Diseases of Antarctic Wildlife (WP 32)	Risk assessment	“Disease” ICG established to identify and diminish risk of wildlife disease .
2000 (CEP III)	Australia	Diseases of Antarctic Wildlife (WP 6)	Risk assessment	Extend Disease ICG with terms of reference: - risk analysis - prevention - response
2000 (CEP III)	SCAR and COMNAP	Wildlife diseases (WP 20)	Risk assessment	
2001 (CEP IV)	Australia	Report on the open-ended intersessional contact group on Diseases of Antarctic Wildlife: Report 1: Review and Risk Assessment (WP 10) and Report 2: Practical Measures to Diminish Risk (Draft) (WP 11).	Risk assessment Education Quarantine Surveillance Response	Disease risk very low: Disease ICG complete. [IP 62 (CEP V)] Set of Guidelines for diminishing risk of disease introduction.
2002 (CEP V)	Australia	Draft Response Plan in the Event that Unusual Animal Deaths are Discovered (IP 62)	Response	Guidelines for contingency plan in the case of suspected disease outbreak (implemented by Australia).
2004 (CEP VII)	Australia	Australia’s Antarctic Quarantine Practises (IP 71)	Education Quarantine Surveillance Response	
2005 (CEP VIII)	Australia	Measures to address the unintentional introduction of non-native biota and disease to the AT Area (WP 28)	Education Quarantine Surveillance Response	Australia proposes ICG on biosecurity (instituted in 2009). New Zealand propose workshop on quarantine and NNS [WP 13 (CEP IX) and IP 46 (CEP IX)].
2005 (CEP VIII)	IUCN	Introduction of NNS, Parasites and Diseases (IP 63)	Risk Assessment	
2005 (CEP VIII)	IAATO	Decontamination Guidelines and the Introduction and Detection of Diseases in Antarctic Wildlife: IAATO’s Perspective (IP 97)	Quarantine	
2005 (CEP VIII)	COMNAP and IAATO	The use of Ballast Water in Antarctica (IP 121)	Marine Quarantine	[WP 5 rev 1 (CEP IX)]
2006 (CEP IX)	United Kingdom	Practical Guidelines for Ballast Water Exchange in the ATA (WP 5 rev 1)		“Ballast Water Exchange in the ATA” Resolution 3 ATCM XXIX (2006)
2006 (CEP IX)	New Zealand	“NNS in the Antarctic”: Report of a Workshop (WP 13) and “NNS in the Antarctic”: A Workshop (IP 46)	Risk Assessment Education Quarantine Surveillance Response	CEP supports recommendations: - highest priority for CEP - CEP takes lead on issue - provide information and take advise from relevant bodies - build knowledge base - integrate into existing procedures - prepare comprehensive guidelines on prevention, surveillance, response approach
2006 (CEP IX)	Australia	Principles underpinning Australia’s approach to Antarctic quarantine management (IP 44)	Structure	
2006 (CEP IX)	IUCN	Antarctic NNS: what can we learn from the global situation? (IP 57)	Risk Assessment	
2006 (CEP IX)	COMNAP	The Use of Ballast Water in Antarctica (IP 83) and the Use of Anti-fouling Biocide Paints by national Antarctic Program Vessels (IP 82)	Marine Quarantine	

TABLE 2: SUBMISSIONS TO THE CEP ON NNS (2007-2009)

Year (CEP)	State/NGO	Submission	Category	Practical Consequences
2007 (CEP X)	SCAR	Hull fouling as a source of marine invasion in the Antarctic (IP37)	Marine Quarantine	
2007 (CEP X)	New Zealand	The Invasive Species Database (IP43)	Surveillance	[WP 16 (CEP XI)]
2007 (CEP X)	IUCN	Prevention and Management of Harmful NNS in the Antarctic and the sub-Antarctic (IP126)	Risk Assessment Education Knowledge Base Quarantine Surveillance Response	
2007 (CEP X)	Australia and SCAR	Aliens in Antarctica (IP49)	Risk Assessment Surveillance	
2007 (CEP X)	New Zealand	Non-native species: Pathways and Vectors between New Zealand and Scott Base, Antarctica (NZ) (IP36)	Risk Assessment Surveillance	[IP 36 (CEP XII)]
2008 (CEP XI)	Australia	Antarctic Alien Species Database (WP16)	Surveillance	
2008 (CEP XI)	COMNAP	Survey on existing procedures concerning introduction of NNS in Antarctica (IP98)	Structure	
2008 (CEP XI)	Australia, China, India, Romania and Russian Federation	Measures to protect Larsemann Hills, East Antarctica, from the introduction of NNS (IP17)	Quarantine Surveillance Response	
2008 (CEP XI)	Uruguay	Medidas Previas para evitar la introduccion de especies alienas en la Antartida, en cumplimiento del Anexo II del Protocolo (IP33)	Education Quarantine Surveillance Response	
2008 (CEP XI)	New Zealand	NNS Incursions at Scott Base, Antarctic (IP75)	Surveillance Response	
2008 (CEP XI)	USA	NNS Awareness Campaign: "Don't Pack a Pest" When Travelling to Antarctica (IP93 rev. 1)	Education	
2008 (CEP XI)	USA	Report on Exploration of Antarctic Subglacial Aquatic Environments; Environmental and Scientific Stewardship (IP110)	Quarantine	
2009 (CEP XII)	Australia, France, New Zealand	A work program for CEP action on NNS (WP05)	Structure	NNS focussed ICG established with terms of reference: - objective and key guiding principles - biosecurity measures for transferring into Antarctica and between sites - identify risks
2009 (CEP XII)	United Kingdom	Review of provisions relating to NNS introductions in ASPA and ASMA management plans (WP33) and ASPA and ASMA management plans: review of provisions relating to NNS introductions (IP12)	Protected Areas	
2009 (CEP XII)	New Zealand	A framework for analysing and managing NNS risks in Antarctica (IP36)	Risk Assessment	
2009 (CEP XII)	ASOC	Impacts of local human activities on the Antarctic environment: a review (IP02)	Risk Assessment	
2009 (CEP XII)	AT Secretariat	Topic Summary of CEP discussions on Non-native species (NNS) in Antarctica (SP11)	Structure	
2009 (CEP XII)	South Africa	Propagule transport associated with logistic operations: a South African appraisal of a regional issue (WP23)	Quarantine	United Kingdom to merge the two sets of guidelines.
2009 (CEP XII)	United Kingdom	Procedures for vehicle cleaning to prevent transfer of NNS into and around Antarctica (WP32).	Quarantine	
2009 (CEP XII)	SCAR	SCAR's environmental code of conduct for terrestrial field research in Antarctica (IP04).	Quarantine	Environmental guidelines for scientific activity in Antarctica focused on biosecurity

APPENDIX 2

BIOSECURITY WORK PLAN FOR THE CEP

SOURCES:

1. CEP, Final Report of the Report of the CEP XII (2009), Annex I.
2. Australia, France and New Zealand, 'A Work Program for CEP Action on NNS' ATCM XXXII WP05 (2009).

TABLE 1: 2009 FIVE YEAR CEP WORK PLAN

Note: Only two years have relevant actions for biosecurity.

Issue / Environmental Pressure	Priority for CEP	Actions	Timetable for actions to be addressed at CEP meetings and during the Intercessional periods (subject to annual review)			
			Intereses. period	CEP XIII 2010	Intereses. period	CEP XIV 2011
Introduction of non-native species	1	1. Review Workshop recommendations 2. Develop practical guidelines / standards / norms for all Antarctic operators. 3. Establish a database of non-native species occurrences in Antarctica.	ICG as per the work plan	Consideration of results of Aliens in Antarctic IPY project. Report from the ICG	ICG as per the work plan	Report from the ICG

TABLE 2. 2009-2012 WORK PROGRAMME FOR ICG

CEP XII (2009)	<ul style="list-style-type: none"> • Adopt work program for high priority issue ‘Introduction of non-native species’ and incorporate into five-year work plan • Initiate Intercessional work to commence development of quarantine manual (general aspects) • Consider interim results of Aliens in Antarctica IPY project • Consider outcomes of CEP / SC-CAMLR workshop discussion of non-native species • Review SCAR Code of Conduct
Intercessional Period	<ul style="list-style-type: none"> • Commence development of quarantine manual (general elements) • Members encourage input of non-native species records to Biodiversity Database • SGMP consider measures to address non-native species concerns in protected areas • Consider measures to address non-native species concerns as part of work to develop general guidelines for visitors
CEP XIII (2010)	<ul style="list-style-type: none"> • Consider outcomes of intercessional work and provide directions for further Intercessional work to develop quarantine manual (specific aspects) • Consider results of IPY Aliens in Antarctica project • Dedicated discussion of high risk environment / areas / activities / species and further research and monitoring requirements, and commission expert advice as appropriate (for submission to CEP XIV) • Review work program • Provide progress report to ATCM
Intercessional Period	<ul style="list-style-type: none"> • Continue development of quarantine manual (specific aspects) • As appropriate, development of expert advice on high risk environment / areas / activities / species and further research and monitoring requirements • Members encourage input of non-native species records to Biodiversity Database
CEP XIV (2011)	<ul style="list-style-type: none"> • Consider outcomes of Intercessional work and provide directions for further Intercessional work to develop quarantine manual (specific aspects) • Review non-native species records in Biodiversity Database • Consider expert advice on research and monitoring requirements • Review work program • Provide progress report to ATCM
Intercessional Period	<ul style="list-style-type: none"> • Continued development of specific guidelines • Commission expert advice on research and monitoring requirements
CEP XV (2012)	<ul style="list-style-type: none"> • Consider outcomes of Intercessional work • Review progress on the introduction non-native species and identify any requirements for further work. • Report to ATCM on progress and future work.

APPENDIX 3

BIOSECURITY CONTENT OF INSPECTION REPORTS SINCE PEPAT CAME INTO FORCE

SOURCES:

AT Secretariat, List of Inspections under Article VII of the Antarctic Treaty and Article 14 of the Protocol on Environmental Protection (2009)
< http://www.ats.aq/e/ats_governance_listinspections.htm > at 12 November 2009.

Australia, Peru and United Kingdom, *Report of Joint Inspections Under Article VII Of The Antarctic Treaty And Article 14 of the Environmental Protocol* ATCM XXIX WP 34(2005)

Australia, *Scott Base and Mcmurdo Station: Report of an inspection under Article VII of the Antarctic Treaty and Article 14 of the Protocol on Environmental Protection* ATCM XXVIII WP 16 (2005)

Belgium and France, *Joint Inspection in Eastern Antarctica conducted in 1999 by Belgium and France under Article VII of the Antarctic Treaty* ATCM XXIII IP 42 (1999)

Finland, *Report Of The 2004 Finnish Antarctic Inspection Under Article VII Of The Antarctic Treaty And Article 14 Of The Protocol On Environmental Protection To The Antarctic Treaty* ATCM XXVII IP 31 (2004)

Germany and United Kingdom, *Report Of A Joint Inspection Under Article VII Of The Antarctic Treaty Antarctic Treaty Inspection Programme: January, 1999* ATCM XXIII WP 23 (2000)

New Zealand, United Kingdom and United States, *Ross Sea Protected Area Inspections 2006* ATCM XXIX WP 34 (2006)

Norway, *Report of the 2001 Norwegian Antarctic inspection under Article VII of the Antarctic Treaty and Article 14 of the Protocol on Environmental Protection to the Antarctic Treaty* ATCM XXIV WP 25 (2001)

Sweden, France and New Zealand, *Report of the Antarctic Treaty inspections undertaken jointly by Sweden, France and New Zealand in accordance with Article VII of the Antarctic Treaty and Article 14 of the Protocol on Environmental Protection to the Antarctic Treaty* ATCM XXX WP 16 (2007)

United States *Report of Inspections* ATCM XXX IP 10 (2007)

United States, *Team Report Of The Inspection Conducted In Accordance With Article VII Of The Antarctic Treaty And Article XIV Of The Protocol Under The Auspices of the United States Department of State* ATCM XXIV IP 17 (2001)

TABLE 1: BIOSECURITY IN INSPECTION REPORTS CONDUCTED UNDER ARTICLE VII OF THE AT AND ARTICLE 14 OF PEPAT 2005-2009 [2 PAGES]

Submitted to ATCM	Inspecting Party	Inspected Facilities	Identified NNS/Biosecurity Threats
IP 96/ ATCM XXXII (2009)	Norway	Princess Elisabeth (Belgium) Halley (UK) Novo Airbase	[No report available]
WP 16/ ATCM XXX (2007)	Sweden, France and New Zealand	Amundsen-Scott South Pole (United States) Concordia (France-Italy)	South Pole: Hydroponics permitted. Concordia: None permitted. Both: No measures taken to avoid accidental introduction of NNS. Avian products, carcasses – returned to France/US. US – Hydroponics permitted.
IP 10/ ATCM XXIX (2007)	United States	Rothera (United Kingdom) O'Higgins (Chile) German Receiving Station at O'Higgins (Germany) Esperanza (Argentina) Bellingshausen (Russian Federation) Great Wall (People's Republic of China) Palmer (United States) Field camp at Petermann Island (tour operations) Vessels: M/S National Geographic Endeavour, M/S Lyubov Orlova, M/S Explorer II	Rothera: preventative biosecurity measures in place after transient NNS introduction at base. O'Higgins: None mentioned – even though close contact with indigenous species. Esperanza: All equipment cleaned and fumigated before entering – fresh fruits minimal quantities – no NNS reported. Bellingshausen: Discharge untreated sewage into nearby stream (broken treatment plant). Plants + non-sterile soil possibly not compliant with PEPAT. Great Wall: None mentioned. Tourist vessels: IAATO decontamination measures implemented. No ballast water discharged inside AT area.
WP 34/ ATCM XXIX (2006)	New Zealand, United Kingdom and United States	Protected Areas ASMA 2: McMurdo Dry Valleys; ASPA 116: Cape Bird, New College Valley; ASPA 122: Arrival Heights ASPA 154: Cape Evans; ASPA 157: Cape Royds; ASPA 158: Hut Point	No discussion of NNS or biosecurity threats.
WP 32/ ATCM XXVIII (2005)	Australia, Peru and United Kingdom	Esperanza, Marambio, San Martín, Decepción, Brown, Petrel, Comandante (Argentina) Ferraz (Brazil) St. Kliment Ochridski (Bulgaria) Capitán Arturo Prat. Risopatron. Yelcho, Gabriel Gonzalez Videla, Teniente Luis Carvajal Villaroel (Chile) Unnamed Czech Station, James Ross Island (Czech Republic) Pedro Vicente Maldonado (Ecuador) Great Wall (Peoples Republic of China) King Sejong (Republic of Korea) Bellingshausen (Russian Federation) Gabriel de Castilla, Juan Carlos I (Spain) Akademik Vernadsky (Ukraine) T/N Ruperto Elichiribehety (Uruguay) Rothera Research Station (UK) Vessels and Protected Areas Eco-Nelson (Non Governmental) MV Professor Molchanov (Tourist Vessel) HSM 55: Stonington- East Base; HSM 63: 'Base Y', Horseshoe Island; HSM 61: Base A, Port Lockroy; HSM 62: 'Base F' (Wordie House) Winter Island; HSM 64: 'Base E', Stonington Island	Express identification of biosecurity threats and general identification of lack of biosecurity measures across stations. Bellingshausen: Untreated timber from cold climate. used to build church. House plants. [No other specific NNS or biosecurity threats identified]

Submitted to ATCM	Inspecting Party	Inspected Facilities	Identified NNS/Biosecurity Threats
WP 16/ ATCM XXVIII (2005)	Australia	Mc Murdo Station (United States) Scott Base (New Zealand) RV Nathaniel B Palmer (US vessel) Protected Areas: ASPA 122: Arrival Heights, Hut Point Peninsula, Ross Island; ASPA 158: Hut Point, Ross Island; HSM 18: Hut at Hut Point, Ross Island; HSM 19: Cross at Hut Point, Ross Island; HSM 20: Cross on Observation Hill, Ross Island; HSM 54: Richard E. Byrd Historic Monument, McMurdo Station HSM 75: The A Hut of Scott Base; Tourist activities on Ross Island were also observed	NNS observed Scott Base: No NNS observed, hydroponics facility. McMurdo: No NNS observed at McMurdo. Both stations treat sewage.
IP 31/ ATCM XXVII(2004)	Finland	Troll (Norway) SANAE IV (South Africa) Wasa (Sweden) Neumayer (Germany) Aboa (Finland)	Wasa: Local lichen and moss species periodically inventoried for human impact studies. Neumayer: House plants present.
IP 17/ATCM XXIV (2001)	United States	Jubany (Argentina) Comandante Ferraz (Brazil) Kliment Ohridsky (Bulgaria) Frei (Chile) Escudero (Chile) Great Wall (China) King Sejong (Republic of Korea). Arctowski (Poland) Bellingshausen (Russian Federation) Juan Carlos I (Spain) Vernadsky (Ukraine) Artigas (Uruguay)	Juan Carlon I: Unusual grasses observed. Bellingshausen: Domestic plants present. Frei: Domestic plants present imported prior to PEPAT. Artigas: Visual inspection at Chilean airfield and again upon arrival. No NNS observed. King Sejong: Hydroponics and house plants present.
WP25/ ATCM XXIV (2001)	Norway	Maitri (India) Novolazarevskaya (Russia) SANAE IV (South Africa) Troll (Norway) Site of the former Georg Forster station (Germany) EPICA drilling site (Germany)	Maitri House plants present. Novolazarevskaya House plants present, waste disposed directly into environment.
WP 23/ ATCM XXIII (2000)	Germany and United Kingdom	Esperanza (Argentina) Jubany (Argentina) St Kliment Ochridski (Bulgaria) Presidente Arturo Frei (Chile) Profesor Julio Escudero (Chile) General Bernardo O'Higgins (Chile) Great Wall (China) Receiving Station, O'Higgins (Germany) Arctowski (Poland) Bellingshausen (Russian Federation) Gabriel de Castilla (Spain) Juan Carlos I (Spain) Academic Vernadsky (Ukraine) Rothera Station (United Kingdom) Palmer Station (United States) Artigas (Uruguay) T/N Ruperto Elichiribehety (Uruguay) Marco Polo (Tourist vessel) Academic Ioffe (Tourist vessel) The following Historic Sites and Monuments were also Inspected: HSM 38: Snow Hill HSM 62: 'Base F (Wordie House)' on Winter Island HSM 61: Base A, Port Lockroy HSM 71: Whalers Bay, Deception Island	No mention of NNS or biosecurity threats.
IP42/ ATCM XXIII (1999)	Belgium and France	Mawson (Australia) Davis (Australia) Casey (Australia) Wilkes (Australia & USA) RSV Aurora Australis (Australian Program vessel)	[No full inspection report available] No mention of NNS or biosecurity threats in summary.

TABLE 2: ANALYSIS OF INSPECTION REPORTS

Percentage of Reports Identifying Biosecurity Issues	Research Sites or Abandoned Stations	Stations	Scientific Vessels (Tourist Vessels) [NGO Vessels]	Protected areas
72%	3	39	3(6)[1]	20

APPENDIX 4

TOURIST STATISTICS ANALYSIS

SOURCES

All figures are taken from IAATO, *IAATO Tourist Statistics* <http://www.iaato.org/tourism_stats.html> and do not include vessels with less than 12 passengers or non-IAATO members.

IAATO, *2003-4 Number of Tourists per Site per Vessel – All Antarctic Sites*, (2004) <http://image.zenn.net/REPLACE/CLIENT/1000037/1000116/application/vnd.ms-excel/touristsitevisitct_byvessel_all.xls> at 3 January 2010.

IAATO, *2004-5 Number of Tourists per Site per Vessel – All Antarctic Sites*, (2005) <http://image.zenn.net/REPLACE/CLIENT/1000037/1000116/application/vnd.ms-excel/visitorsitevisitct_byvessel_all0.xls> at 3 January 2010.

IAATO, *2005-6 Number of Tourists per Site per Vessel – All Antarctic Sites*, (2006) <http://image.zenn.net/REPLACE/CLIENT/1000037/1000116/application/vnd.ms-excel/visitorsitevisitct_byvessel_all2.xls> at 3 January 2010.

IAATO, *2006-7 Number of Tourists per Site per Vessel – All Antarctic Sites*, (2007) <<http://image.zenn.net/REPLACE/CLIENT/1000037/1000116/application/vnd.ms-excel/VSV-vessel-all-all.xls>> at 3 January 2010.

IAATO, *2007-8 Number of Tourists per Site per Vessel – All Antarctic Sites*, (2008) <http://image.zenn.net/REPLACE/CLIENT/1000037/1000116/application/vnd.ms-excel/Visitorsitevisitct_byvessel_all1.xls> at 3 January 2010.

IAATO, *2008-9 Number of Tourists per Site per Vessel – All Antarctic Sites*, (2009) <http://image.zenn.net/REPLACE/CLIENT/1000037/1000116/application/vnd.ms-excel/10.visitorsitevisitct_byvessel_all6sheets.xls> at 3 January 2010.

TABLE 1: TRENDS OF VISITORS AT SITES PROTECTED BY SITE GUIDELINES

	2008-9	2007-8	2006-7	2005-6	2004-5	2003-4	Site Guidelines
Aitcho Barrientos Island	5568	6083	6362	5600	3520	5508	2005
Cuerville Island	15244	19790	15607	10921	10523	13980	2005
Jougla Point	8431	11252	8927	7547	7169	7913	2005
Penguin Island	1737	2189	1480	1724	1419	2647	2005
Goudier Island	13863	16640	15266	11472	8954	12496	2006
Hannah Point	2678	2039	94	5601	3873	4973	2006
Neko Harbor	12470	14023	13107	11749	9452	9627	2006
Paulet Island	7814	4978	5561	4507	3611	1968	2006
Petermann Island	9098	13247	11241	9215	2756	7543	2006
Pléneau Island	7422	6739	6258	4592	1825	6223	2006
Turret Point	273	994	141	414	253	115	2006
Yankee Harbour	2,072	3987	3273	2521	1,872	3,497	2006
Brown Bluff	5752	6674	7434	5629	5116	2293	2007
Snow Hill Emperor Rookery	807	572	1008	0	64	0	2007
Snow Hill Island	284	276	0	520	1150	72	2007
Devil Island	2852	925	2809	2370	1992	529	2008
Half Moon Island	11844	17984	13281	12086	9819	10871	2008
Shingle Cove	346	92	1014	282	307	1069	2008
Whalers Bay	12128	14858	15347	13749	10570	11928	2008
Baily Head	1989	1937	2279	3504	1294	2459	2009
Cape Royds	236	147	377	390	502	398	2009
Detaille Island	1402	1071	754	155	0	1073	2009
Horseshoe Island	1020	337	261	0	323	229	2009
Stonington Island	1153	450	330	0	98	219	2009
Telefon Bay	3049	3068	3252	2184	1510	1541	2009
Winter Island	198	360	425	52	0	70	2009
Total Visitors to all sites	340634	379626	326331	237412	174355	223166	
Total Sites (Recruitment)	202	186	193	181	175	151	
Average increase in visitors per site per year (Overall)	-193	287	461	348	-279		
Average increase in visitors per year	-1192.579	914.9333	954.5	790.25	n/a	n/a	
Average increase in visitors per site per year	239.5714	100	546.4286	1165.955	-818.038	239.5714	

Before Site Guidelines Adopted
After Site Guidelines Adopted

TABLE 2: VISITORS TO CONTINENTAL SITES IN THE 2008/2009 SEASON

Visitation Locations	Total Visitors	Claimant State
Cape Washington	196	Australia
Commonwealth Bay	100	Australia
Franklin Island	169	Australia
Terra Nova Station	48	Australia
Cape Decouverte	41	France
Cape Jules	220	France
Cape Mergerie	41	France
Dumont D'Urville Station	443	France
Port Martin	266	France
Cape Adare	369	New Zealand
Cape Bird	111	New Zealand
Cape Colbeck	99	New Zealand
Cape Evans	227	New Zealand
Cape Gray	85	New Zealand
Cape Hallett	270	New Zealand
Cape Royds	236	New Zealand
Coulman Island	442	New Zealand
Drygalski Ice Tongue	198	New Zealand
Inexpressible Island	116	New Zealand
McMurdo Ice Channel	47	New Zealand
McMurdo Station	267	New Zealand
Mertz Glacier Tongue	308	New Zealand
Possession Island	162	New Zealand
Ross Ice Shelf	241	New Zealand
Ross Sea	84	New Zealand
Scott Base	83	New Zealand
Taylor Valley/Canada Glacier	155	New Zealand
Patriot Hills	282	Unclaimed
Total	5306	

APPENDIX 5:

ANALYSIS OF IMPLEMENTATION OF BIOSECURITY MEASURES IN THE CBD BY AT CONSULTATIVE PARTIES AND CCAML MEMBERS BASED ON NATIONAL REPORTS SUBMITTED UNDER ARTICLE 26 OF THE CBD, 2001-2009

SOURCE:

CBD, *National Reports Analyser* (2010) <<http://www.cbd.int/reports/analyzer.shtml>> at 20 February 2010.

Note: Most are Third National Reports submitted 2005-2009, four are Second National Reports submitted from 2001-2002; Italy, Slovakia and Switzerland, and consequentially have no information on the implementation of the Guiding Principles under CBD COP Decision VI/23.

KEY:

Points are allocated, according to meeting the requirements of the question under the reporting process, referring to relevant obligations under the CBD. Some questions are allocated additional points, as they identify multiple components of a biosecurity system. For the purpose of the analysis of the current applicable system, only those measures reported as in place are allocated points (19 = best possible within parameters).

CP: Consultative Party to the AT

NCP: Non Consultative Party to the AT

CM: Member of CCAMLR

NCM: Party to CCAMLR, but not member of the Commission

	3	2	1	0
1. Please indicate the level of priority your country accords to the implementation of various articles, provisions and relevant programmes on the work of the Convention...8(a) Invasive Alien Species.		High	Medium	Low
45. Has your country identified alien species introduced into its territory and established a system for tracking the introduction of alien species?	Major NNS identified, surveillance	Some NNS identified, surveillance	Some NNS identified	No
46. Has your country assessed the risks posed to ecosystems, habitats or species by the introduction of alien species?		Most alien species	Some NNS of concern	No
47. Has your country undertaken measures to prevent the introduction of, control or eradicate, those NNS which threaten ecosystems, habitats or species?		Comprehensive measures	Some measures	No/being considered
48 In dealing with the issue of invasive species, has your country developed, or involved itself in mechanisms for international cooperation including the exchange of best practises?	Multilateral	Regional and/or sub regional	Bilateral only	No
49. Is your country using the ecosystem approach and precautionary principle and bio-geographical approaches as appropriate in its work on alien invasive species?			Yes	No
50. Has your country identified national needs and priorities for the implementation of the Guiding Principles?			Yes	No/being considered
51. Has your country created mechanisms to coordinate national programs in applying the Guiding Principles?			Yes	No/being considered
52. Has your country reviewed relevant policies, legislation and institutions in the light of the Guiding Principles and adjusted or developed policies, legislation and institutions?		Some adjustments and developments completed	Review complete /ongoing development	No/review under way
53. Is your country enhancing cooperation between various sectors in order to improve prevention, early detection, eradication and/or control of invasive species?			Yes	No/being considered
54. Is your country collaborating with trading partners and neighbouring countries to address threats of invasive alien species to biodiversity in ecosystems that cross international boundaries			Yes	No/being considered
55. Is your country developing capacity to use risk assessment to address threats of invasive alien species to biodiversity and incorporate such methodologies in environmental impact assessment (EIA) and strategic environmental assessment (SEA)?		Yes, comprehensive activities	Yes, some	No
56. Development of financial measures and other policies and tools to promote activities to reduce the threats of invasive species				
160. Has your country put in place mechanisms to control pathways of introduction of alien species in the marine and coastal environment?				
- Mechanisms to control potential invasions from ballast water have been put in place			Yes	No
- Mechanisms to control potential invasions from hull fouling have been put in place			Yes	No
- Mechanisms to control potential invasions from hull fouling have been put in place			Yes	No
- Mechanisms to control potential invasions from aquaculture have been put in place			Yes	No
- Mechanisms to control potential invasions from accidental releases, such as aquarium releases, have been put in place			Yes	No

TABLE 1: IMPLEMENTATION OF CBD, ARTICLE 8(h) AND DECISION V/8 OF THE CBD COP

	ATS Status	Priority	Surveillance/ Knowledge Base	Risk Assessment	Prevention and Response	International Cooperation (Decision V/8)	Ecosystem /Precautionary /Bio-geographic approach (Decision V/8)
Argentina	CP/CM	1	1	1	1	1	0
Australia	CP/CM	2	1	2	2	3	1
Belgium	CP/CM	1	2	1	1	1	0
Brazil	CP/CM	0	1	1	1	0	0
Chile	CP/CM	1	1	2	1	3	1
China	CP/CM	2	1	1	1	2	1
Denmark	CP	0	1	1	1	2	1
Finland	CP/NCM	1	2	1	1	3	1
France	CP/CM	2	3	1	1	3	0
Germany	CP/CM	2	1	1	1	3	1
Hungary	CP	1	3	2	1	3	0
India	CP/CM	2	2	1	1	2	1
Japan	CP/CM	2	3	1	2	3	1
Netherlands	CP	1	1	1	2	3	1
New Zealand	CP/CM	2	2	2	1	3	1
Norway	CP/CM	2	1	1	1	3	1
Poland	CP/CM	2	2	2	1	1	1
Korea	CP/CM	1	1	1	1	1	1
Russia	CP/CM	1	2	1	1	3	1
South Africa	CP/CM	2	1	1	1	3	0
Spain	CP	2	0	1	1	2	1
Sweden	CP/CM	1	1	2	1	3	1
Ukraine	CP/CM	0	1	0	1	2	1
UK	CP	2	2	2	1	3	1
Namibia	CM	1	2	1	1	2	1

TABLE 2: CBD DECISION VI/23 – GUIDING PRINCIPLES

	AT Status	Identified Priority and Needs	Created mechanism	Reviewed and Adjusted Policy	Cooperation between sectors	Cooperation with trading partners	Incorporate risk assessment into EIA and SEA	Financial measures and other policies
Argentina	CP/CM	1	0	1	0	1	0	1
Australia	CP/CM	1	0	0	0	1	0	0
Belgium	CP/CM	0	0	0	0	0	0	0
Brazil	CP/CM	1	0	1	0	1	0	1
Chile	CP/CM	1	1	1	0	1	1	1
China	CP/CM	1	0	1	0	1	0	1
Denmark	CP	1	0	1	0	1	0	1
Finland	CP/NCM	1	0	1	0	1	0	1
France	CP/CM	0	0	1	0	0	0	1
Germany	CP/CM	1	0	0	0	1	0	0
India	CP/CM	1	0	1	0	1	0	1
Japan	CP/CM	0	0	1	0	0	0	1
Netherlands	CP	1	0	0	0	1	0	0
New Zealand	CP/CM	1	0	0	0	1	0	0
Norway	CP/CM	1	0	1	0	1	0	1
Poland	CP/CM	1	0	1	0	1	0	1
Korea	CP/CM	1	0	1	0	1	0	1
Russia	CP/CM	0	0	0	0	0	0	0
South Africa	CP/CM	1	0	0	0	1	0	0
Spain	CP	1	0	1	0	1	0	1
Sweden	CP/CM	0	0	0	0	0	0	0
Ukraine	CP/CM	1	0	0	0	1	0	0
UK	CP	1	0	0	0	1	0	0
Namibia	CM	0	0	1	0	0	0	1

**TABLE 3: COP DECISION IV/5 - PROGRAMME OF WORK ON MARINE AND COASTAL
BIODIVERSITY ELEMENT 5: ALIEN SPECIES AND GENOMES**

	AT Status	Ballast Water	Hull Fouling	Aquaculture	Accidental
Argentina	CP/CM	1	0	1	0
Australia	CP/CM	1	0	0	0
Belgium	CP/CM	0	0	0	0
Brazil	CP/CM	1	0	1	0
Chile	CP/CM	1	1	1	0
China	CP/CM	1	0	1	0
Denmark	CP	1	0	1	0
Finland	CP/NM	1	0	1	0
France	CP/CM	0	0	1	0
Germany	CP/CM	1	0	0	0
India	CP/CM	1	0	1	0
Japan	CP/CM	0	0	1	0
Netherlands	CP	1	0	0	0
New Zealand	CP/CM	1	0	0	0
Norway	CP/CM	1	0	1	0
Poland	CP/CM	1	0	1	0
Korea	CP/CM	1	0	1	0
Russia	CP/CM	0	0	0	0
South Africa	CP/CM	1	0	0	0
Spain	CP	1	0	1	0
Sweden	CP/CM	0	0	0	0
Ukraine	CP/CM	1	0	0	0
UK	CP	1	0	0	0
Namibia	CM	0	0	1	0

APPENDIX 6

BIOSECURITY MEASURES EMPLOYED BY AUSTRALIA AND NEW ZEALAND IN SUB-ANTARCTIC AND ANTARCTIC AREAS

SOURCES

The references used to compile this appendix include a number of different documents and policies, listed in the following table. The scope of activity on the islands and continent differ significantly and a categorical analysis of this kind cannot be relied on as an entirely accurate depiction of the current biosecurity measures applied in the sub-Antarctic and Antarctic environment.

	New Zealand	Australia
Legislation and Regulations	<p><i>Biosecurity Act 1993</i> <i>Hazardous Substances and New Organisms Act 1999</i> <i>Maritime Transport Act 1994</i></p> <p>Antarctic <i>Antarctic (Environmental Protection) Act 1994</i> <i>Antarctic Marine Living Resources Act 1981</i> <i>Marine Protection Rules, Part 160 – Prevention of Pollution by Sewage from Ships in the Antarctic Treaty Area</i> (effective 20 August 1998); <i>Part 170 – Prevention of Pollution of Garbage from Ships and Offshore Installations</i> (effective 30 July 2009). MAFBNZ, Import Health Certificate for Ballast Water (2005). Sub-Antarctic <i>Reserves Act 1977</i> <i>Marine Reserves Act 1971</i> <i>Conservation Act 1987</i></p>	<p><i>Quarantine Act 1908</i> <i>EPBC Act 1999</i> <i>EPBC Regulations 2000</i></p> <p>Antarctic <i>Antarctic (Environmental Protection) Act 1994</i> <i>Antarctic Treaty (Environment Protection) (Environmental Impact Assessment) Regulations 1993</i> <i>Antarctic Treaty (Environment Protection) (Waste Management) Regulations 1994</i> <i>Protection of the Sea (Prevention of Pollution from Ships) Act 1983</i>, Section 26BA-BC – Discharge of sewage in the Antarctic Area; Section 26F(8) – Discharge of garbage in the Antarctic Area. Sub-Antarctic <i>EPMO 1987</i> <i>NPRM Act (Tasmania) 2002</i></p>
Management Plans, Policy and Guidelines	<p>Antarctic Antarctica New Zealand, <i>New Zealand's Antarctic and Southern Ocean Science Strategy</i> (2009). Antarctica New Zealand, <i>Biosecurity and NNS Policy</i>, Health, Safety and Environment Policy – 7, (2009). ANZ, <i>Waste Management Handbook</i> (2007) MFAT, New Zealand procedures for tourists and non-governmental visitors to Antarctic, (2009). Antarctica New Zealand, <i>Environmental Code of Conduct</i>, (2006). Sub-Antarctic DOC, <i>NZSAI Research Strategy</i> (2005). DOC, <i>Operational Procedures for Management and Research Expeditions in the New Zealand Sub-Antarctic</i> (2008). DOC, <i>Island Biosecurity Plan</i> (2004). DOC, <i>NZSAI Conservation Management Strategy 1998-2008</i> [extended to 2012].</p>	<p>Antarctic AAD, <i>Australian Science Strategy</i> (2009). AAD, <i>Australian Guidelines for preparation of IEEs and CEEs</i> (2005). Sub-Antarctic AAD, Heard Island and McDonald Islands Marine Reserve Management Plan (2005). Parks and Wildlife Service (Tasmania), Macquarie Island Nature Reserve and World Heritage Area Management Plan (2006). Parks and Wildlife Service (Tasmania), Guidelines for Tourist Operations and Visits to Macquarie island Nature Reserve and World Heritage Area (2009). Interim Management Arrangements for the Macquarie Island Marine Park (2009).</p>
Secondary Materials	<p>New Zealand, 'A Framework for Analysing and Managing non-native species Risks in Antarctica,' XXXII ATCM (2009), IP 36, page 4.</p>	<p>S Potter, 'Quarantine Management of Australia's Antarctic Program' (2006). S Potter 'The Quarantine Protection of Sub-Antarctic Australia: Two Islands, Two Regimes' (2007). Australia, 'Australia's Quarantine Practises', XXVII ATCM (2004) Kaye, S. B., D. Rothwell and S. Dando, <i>The laws of the Australian Antarctic Territory</i> (1999)</p>

GLOSSARY AND KEY

1. Application Process
 2. Preparation for transit
 3. Transit
 4. Arrival
 5. On Land/Within Marine Area
 6. Surveillance
 7. Response
 - S. Science Specific
 - T. Tourism Specific
 - F. Fishing Specific
 - NZ-M – Minimum Impact Islands of the New Zealand Sub-Antarctic
 - NZ-R – Refuge Islands of the New Zealand Sub-Antarctic
 - NZ-A – Ross Dependency and New Zealand Nationals in the Antarctic area
 - A-M – Macquarie Island
 - A-H – Heard and McDonald Islands
 - A-A – Australian Antarctic Territory and Australian Nationals in the Antarctic area
- Specific designation of marine area provided where biosecurity measures apply.

TABLE 1: APPLICATION PROCESS AND PREPARATION FOR TRANSIT

Biosecurity Measure	NZ-M	NZ-R	NZ-A	A-M	A-H	A-A
1.1 EIA required for activity.	No	No	Yes ¹	No	No	Yes ²
1.2 Work with Domestic Biosecurity Agencies	Yes	Yes	Yes	Yes	Yes	Yes
1.2 Permit required for entry to marine area	No	No	No	Yes ³	No	No
1.3 Permit required for landing	Yes	Yes	No	Yes	Yes	No
1.4 EIA required for infrastructure development	Yes	Yes	Yes	Yes	Yes	Yes
1.T.1 Landing for tourist purposes prohibited.	Yes	No ⁴	No	No ⁵	No ⁶	No
1.F.1 Fishing in marine area prohibited.	No	No ⁷	No ⁸	Yes ⁹	Yes	No ¹⁰
1.5 Biosecurity measures required in EIA or Permit Application	Yes	Yes	Yes	Yes	Yes	Yes
1.S.1 Priority placed on research proposal that support NNS biosecurity measures	Yes	Yes	No ¹¹	Yes	Yes	No ¹²
1.6 Biosecurity risk assessment carried out on all activity	No ¹³	No	No ¹⁴	No	No	No
1.7 Suppliers made aware of biosecurity policy	Yes	Yes	Yes	No	No	Yes
2.1 Separate quarantine store biosecurity plan	Yes	Yes	No ¹⁵	No ¹⁶	No ¹⁷	No
2.2 All stores ¹⁸ to be inspected before departure	Yes	Yes	No ¹⁹	Yes	Yes	No ²⁰
2.3 Treatment of stores before departure to minimise NNS risks	No	Yes ²¹	No	Yes ²²	Yes ²³	Yes ²⁴
2.4 Sniffer dogs to be used in the pre-departure inspection	Yes	Yes	No	Yes	Yes	No ²⁵
2.5 Personal equipment to be cleaned and inspected before departure	Yes	Yes ²⁶	No	Yes	Yes	No
2.6 Previous port of call to be Australian/AQIS/NZ controlled	No ²⁷	No ²⁸	No	Yes	No	No
2.7 Inspection and cleaning of ship's hull required before departure	Yes ²⁹	Yes ³⁰	No	Yes ³¹	Yes ³²	No
2.8 Requirement to apply anti-foulants to ship's hulls	No	No	No	No	Yes ³³	No
2.9 Requirement for ships to be inspected prior to departure	Yes	Yes	No	Yes ³⁴	No	No
2.1S Third party hand inspection of all equipment and supplies before departure	Yes	Yes ³⁵	No	No	No ³⁶	No
2.11 All visitors must be informed of quarantine procedures	Yes	Yes	Yes ³⁷	Yes	Yes	Yes ³⁸

¹ Not for fishing activities.

² Ibid.

³ Section 37 of the Tasmanian NPRMA restricts access to the reserve to 3 nautical miles of the reserve.

⁴ Limited numbers of tourists permitted within specific areas.

⁵ Ibid.

⁶ Ibid.

⁷ Fishing prohibited in Auckland Islands Marine Reserve.

⁸ Permit required, conditional on CCAMLR approval. No fishing permitted in the South Orkney marine protected area.

⁹ Within 3 nautical miles of the reserve and within the Marine Reserve.

¹⁰ Permit required, conditional on CCAMLR approval. No fishing permitted in the South Orkney marine protected area.

¹¹ Draft science strategy "supports biodiversity research related to...New Zealand's commitments to the CBD."

¹² Human impacts targeted in Australian Antarctic Science Strategy.

¹³ Risk assessment carried out for islands, not marine areas.

¹⁴ Carried out on scientific program in 2008.

¹⁵ Biosecurity measures in place in relation to stores.

¹⁶ Ibid.

¹⁷ Ibid.

¹⁸ Including all cargo, effects and food.

¹⁹ Stores for Antarctica New Zealand supported events will be inspected prior to departure.

²⁰ Stores for AAD supported events will be inspected prior to departure.

²¹ Equipment and materials considered to be high risk may be subjected to fumigation.

²² Fumigation of timber products or other approved treatment of timber prior to departure.

²³ Ozone treatment of produce during transit for AAD operations.

²⁴ Ibid; fumigation and treatment of high risk goods before transit.

²⁵ Ibid.

²⁶ Footwear to be thoroughly scrubbed and washed in disinfectant.

²⁷ Ships must be certified within 28 days of visit to island, so practically limited to New Zealand ports.

²⁸ Ibid.

²⁹ Sub-Antarctic Vessel Inspection Certificate valid for 28 days from date of inspection.

³⁰ Ibid.

³¹ Not routinely compliance checked by land manager (Potter 2007).

³² Ibid.

³³ Ibid.

³⁴ Discretionary (Potter 2007).

³⁵ Island Biosecurity Plan 2.4.3: The inspector is DOC personnel but "preferably" should not be travelling to the island, meaning the inspector is not the government representative, further ensuring independence.

³⁶ Third party hand inspection of all personal effects landed.

³⁷ Not applicable to fishing vessels.

³⁸ Ibid.

TABLE 2: TRANSIT AND ARRIVAL

Biosecurity Measure	NZ-M	NZ-R	NZ-A	A-M	A-H	A-A
3.2 Authorised official to accompany any visit to ensure compliance with quarantine requirements	Yes	Yes	No ³⁹	No	Yes ⁴⁰	No ⁴¹
3.3 No departure during night unless well lit port	Yes	Yes	No	No	No	No
3.5 Laying of rodent baits and traps on ships	No	No	No	No	Yes	No
3.6 Insect trapping on ships	No	No	No	No	Yes	No
3.7 Disinsection of Aircraft	No	No	Yes	No	No	Yes
3.8 Containerization of cargo during shipment, where practicable	Yes	Yes	No	No	No	Yes
3.9 Equipment must be transferred to and from area in rodent proof containers	Yes	Yes	No	No	No	Yes
3.10 Actions to ensure cleanliness of stores and transport between areas	Yes	Yes	No	Yes ⁴²	Yes	No
3.11 Ban on transporting live plants and animals unless specifically permitted	Yes	Yes	Yes	Yes	Yes	Yes
4.1 Ballast water discharge prohibited in marine area	No ⁴³	No ⁴⁴	No	Yes ⁴⁵	Yes ⁴⁶	No
4.2 No ships may moor to store	No ⁴⁷	No ⁴⁸	No	No	Yes ⁴⁹	No
4.3 Laying of rodent baits and traps at landing area	No ⁵⁰	No ⁵¹	n/a ⁵²	No	Yes	No
4.4 Loading and unloading supervised by authorised representative	Yes	Yes	No	Yes	Yes	No
4.5 Pre-landing scrubbing of footwear	Yes	Yes	No	No	No	No
4.6 Ban on landing all foods apart from emergency supplies	No	No	No	Yes	No	No
4.7 Ban on landing live plants and animals unless specifically permitted	Yes	Yes	Yes	Yes	Yes	Yes
4.8 Ban on import of soil	Yes	Yes	No ⁵³	Yes	Yes	No ⁵⁴
4.9 Ban on landing fresh fruit and vegetables	NZSAI-M	NZSAI-R	No	Yes ⁵⁵	Yes	No
4.10 Ban on landing poultry meat and eggs	No	Yes ⁵⁶	No	Yes	Yes ⁵⁷	No
4.11 Ban on landing viable seeds and viable fungal products	Yes ⁵⁸	Yes ⁵⁹	No	No	Yes	No
4.13 Ban on dogs	No	No ⁶⁰	Yes	No ⁶¹	No ⁶²	Yes
4.14 Requirement for outer clothing to be new or used only at area	No	No	No	No	Yes	No
4.15 Pre-landing scrubbing of footwear	Yes	Yes	No	Yes	Yes	Yes

³⁹ Except for tourist vessels wishing to land in the Ross Dependency.

⁴⁰ Discretionary (Potter 2007).

⁴¹ Discretionary in relation to tourist vessels wishing to land in the AAT (Potter 2006).

⁴² Not routinely checked by land manager (Potter 2007).

⁴³ All ballast water discharged in New Zealand waters must be preapproved by MAFBNZ.

⁴⁴ Ibid.

⁴⁵ Within 12 nautical miles of land and in marine reserve.

⁴⁶ Ibid.

⁴⁷ Mooring only permitted at approved places.

⁴⁸ Mooring only permitted at approved places.

⁴⁹ Other than small supply vessels.

⁵⁰ Permanent trap and bait stations exist near most landing areas that must be maintained.

⁵¹ Ibid.

⁵² Rodents well established on island.

⁵³ PEPAT, Annex II, Article 4(9) prohibits the introduction of non sterile soil.

⁵⁴ Ibid.

⁵⁵ Unless land manager is satisfied they have been effectively treated to eliminate the risk of introducing associated alien species and diseases.

⁵⁶ Eggs are permitted but shells must be sealed as rubbish and removed.

⁵⁷ Other than egg powder or products containing egg powder, which can be taken ashore if kept in sealed containers and opened only in an enclosed shelter.

⁵⁸ Unless permitted.

⁵⁹ Unless permitted.

⁶⁰ Dogs must be certified for DOC use and "may need to be screened for pathogens". 2.5.2.

⁶¹ Subject to permit.

⁶² Ibid.

TABLE 3: PREVENTION, SURVEILLANCE, RESPONSE AT LOCATION

Biosecurity Measure	NZ-M	NZ-R	NZ-A	A-M	A-H	A-A
5.1 Unpacking of equipment must be undertaken to avoid introduction of NNS	Yes	Yes	No	No	Yes	Yes
5.2 Signs with biosecurity principles at landing locations	No	Yes	No	No	No	No
5.3 Hydroponics banned	Yes	Yes	Yes	No	Yes	No
5.1S Cleaning of equipment and clothing between areas	Yes	Yes	Yes	No	No	No
5.2S Disinfection of scientific equipment in contact with animals between areas	Yes	Yes	Yes	No	Yes	No
5.4 Restrictions on taking certain food stuffs off station	n/a	n/a	No	Yes	N/a	No
5.5 All waste must be removed	Yes ⁶³	Yes ⁶⁴	No	No	No	No
5.6 All waste must be removed, incinerated or disposed in a way to minimise impacts	Yes ⁶⁵	Yes ⁶⁶	Yes	No	Yes	Yes
5.7 Potential NNS harvesting waste must be removed	Yes ⁶⁷	Yes ⁶⁸	No	No ⁶⁹	Yes ⁷⁰	No
5.8 Any huts must be rodent proof	Yes	Yes	No	No	No	No
5.9 Moving between areas, biosecurity standards must be applied as if moving from mainland	Yes	Yes	No	No	No	No
6.1 Management staff trained to detect and recognise NNS and NNS signs	Yes	Yes	No	Yes	Yes	No ⁷¹
6.2 Procedures in place for visitors to report suspected NNS or disease outbreak.	Yes	Yes	No	Yes	Yes	Yes
6.3 Presence of permanent NNS surveillance equipment	Yes	Yes	No ⁷²	No	No	No
6.4 Database of NNS maintained	Yes	Yes	Yes	No	Yes	Yes
6.1.T Tourist vessels required to report and monitor NNS	n/a	Yes	No	Yes	Yes	No
6.1.S Priority placed on science that supports NNS monitoring	Yes	Yes	No	No	Yes	No
7.1 Contingency plan for NNS found during transit to area	Yes	Yes	No	No	No	No
7.2 Contingency plans for NNS found in area	Yes	Yes	No	Yes	Yes	Yes ⁷³
7.3 Procedures in place to immediately respond if NNS detected	Yes	Yes	No	Yes	Yes	Yes ⁷⁴
7.4 All visitors participate in long term NNS control programs	Yes	Yes	N/A	Yes	No	N/A
7.5 Commitment to eradicate invasive NNS from area	Yes	Yes	No	Yes	Yes	No
7.6 Costs of management action to be recovered from those responsible for introduction of NNS	No	No	No ⁷⁵	No	Yes	No ⁷⁶

⁶³ With exception of faeces to be deposited in pit toilets, at least 50 metres away from nearest ground water supply.

⁶⁴ Ibid.

⁶⁵ Ibid.

⁶⁶ Ibid.

⁶⁷ Ibid.

⁶⁸ Ibid.

⁶⁹ Human faeces deposited into the sea from field huts, bagged and carried to the sea or station in "Zone B". Otherwise no requirement for disposal, other than not feeding foods to wildlife.

⁷⁰ Incinerated and removed.

⁷¹ Unusual mortality event plan in place (disease only).

⁷² Monitoring and control systems maintained as required.

⁷³ Unusual mortality event plan in place (disease only).

⁷⁴ Unusual mortality event plan in place (disease only).

⁷⁵ See Chapter 2, Section 2.3.2

⁷⁶ See Chapter 2, Section 2.3.2

APPENDIX 7

BUILDING BIOSECURITY INTO EXISTING RESOLUTIONS AND PROCEDURES

Tool	Relevant Guidance	Objective of Amendment(s)
EIA	1. Revised EIA guidelines 2. Intercessional Consideration of Draft CEEs	Any risk of introducing NNS, without a clear demonstration of preventative measures (including contingency plans) that reduce the risk to a negligent level, should be defined as more than a minor or transitory impact and require a full CEE. (1) Preventing the introduction NNS should be considered at all stages of the decision making process. (1) Intercessional Consideration of Draft CEEs to give particular attention to issue of NNS. (2)
Protected Areas	1. Guidelines for the implementation of the Framework for Protected Areas 2. Guide to the Preparation of Management Plans for Specially Protected Areas 3. Checklist to assist in the inspections of ASPAs and ASMAAs 4. SGMP of the CEP	Consideration given to areas at risk of NNS introduction in establishing a framework of protected areas. (1) "In all instances special precautions should be taken to prevent the introduction of NNS." (2) Inspection checklist to include "Evidence of NNS mitigation measures" and "Presence or evidence of NNS." Samples should be taken of local biota to check for NNS presence. (3) SGMP to identify and highlight biosecurity risks in proposed management plans.
Marine Pollution	1. Ballast Water Management Guidelines	Encourage ratification and implementation of BWM Convention among Parties. Require all ships in Antarctic Treaty area to implement approved ballast water treatment method by 2012. Ballast water exchange as a method, to be phased out by 2012.
Inspection	1. Inspection Checklist	Inspection checklist to include "Evidence of NNS mitigation measures" and "Presence or evidence of NNS." Samples should be taken of local biota to check for NNS presence. (1)
Reporting	1. Information Exchange Requirements	Environmental information on Compliance with the Protocol to include "2.4.3 Monitoring activities report...Presence of NNS in transit locations, stations and field camps." "2.4.5. Steps taken to minimise the introduction of NNS from transit, station activities, field camps and waste management" "3.4. Contingency Plans: Title of Contingency Plan(s) for...NNS Introduction"
Science	1. SCAR Environmental Code of Conduct for Terrestrial Scientific Field Research in Antarctica (revision 12 January, 2009)	Integrate or produce guidelines for marine research. Include monitoring for NNS in all studies and contingency plans.
Tourism	1. General Principles of Antarctic Tourism 2. Tourist Guidelines 3. Site Guidelines	No tourist operator should intentionally or unintentionally introduce any NNS into the AT area through their activities and preventative, surveillance and response measures based on a precautionary and ecosystem approach should continue to be built into operational procedures. (1) Operators must take a strict precautionary approach to NNS in the AT area and employ comprehensive systems to exclude their introduction or establishment in the AT area. (2) "Special precautions should be taken to prevent the introduction of NNS". (3)
IAATO Bylaws	1. Article X: Operational Procedures	All ships must employ ballast water treatment systems approved by MEPC under the BWM Convention. All ships entering the Antarctic area must have their hulls cleaned of all NNS and inspected before departure. Waste management and landing procedures must not introduce NNS into the Antarctic environment.
CCAMLR CM	1. 26-01 (Environmental Measures) 2. 91-02 (Allocation of CEMP sites) 3. 91-03 (Protection of South Orkneys)	[See IAATO Bylaws above] (1) Decontamination of all fishing equipment required at all times fishing equipment has been in contact with the water column. (1) Special precautions should be taken to prevent the introduction of NNS in CEMP sites and MPAs (2). No discharges should be permitted in MPAs (3).

APPENDIX 8

ANTARCTIC ACTORS TREATY MATRIX

States included in matrix: AT Parties, CCAMLR Parties and Flag States listed on the CCAMLR IUU Vessel List and IAATO vessel registry.

SOURCES:

Format adapted from: M Rogan-Finnemore, *The Legal Implications of Bioprospecting in the Antarctic*, (LLM, University of Canterbury, 2005), 147-148.

The Antarctic Treaty System:

Status - AT Secretariat, *Home/Antarctic Treaty System/Parties*, <http://www.ats.aq/devAS/ats_parties.aspx?lang=e> at 7 July 2010

AT - *The Antarctic Treaty*, opened for signature 1 December 1959. 402 *United Nations Treaty Series* 71 (entered into force 23 June 1961)

Protocol on Environmental Protection to the Antarctic Treaty, opened for signature 4 October 1991. 30 *International Legal Materials* 1455 (entered into force 14 January 1998)

CCAMLR - *Convention on the Conservation of Antarctic Marine Living Resources*, opened for signature on 20 May 1980, 19 *International Legal Materials* (1980) (entered into force 7 April 1982)

CCAS - *Convention on the Conservation of Antarctic Seals*, opened for signature on 1 June 1972, 29 *UST* 441 (entered into force March 11 1978)

PEPAT- *Protocol on Environmental Protection to the Antarctic Treaty*, opened for signature 4 October 1991, 30 *International Legal Materials* (1991) (entered into force 14 January 1998)

UNEP

Status – CBD, *List of Parties*, <<http://www.cbd.int/information/parties.shtml>> at 7 July 2010; CMS, *Parties to the Convention on the Conservation of Migratory Species of Wild Animals* (2010) < http://www.cms.int/about/part_1st.htm > at 7 July 2010

CMS - *Convention on the conservation of migratory species of wild animals*, opened for signature 23 June 1979. 1615 *United Nations Treaty Series* 356 (entered into force 1 November 1983)

CBD - *Convention on Biological Diversity*, opened for signature 5 June 1992. 1760 *United Nations Treaty Series* 79 (entered into force 29 December 1993)

Law of the Sea

Status - UNCLOS, *Status of the United Nations Convention on the Law of the Sea, of the Agreement relating to the implementation of Part XI of the Convention and of the Agreement for the implementation of the provisions of the Convention relating to the conservation and management of straddling fish stocks and highly migratory fish stocks* <http://www.un.org/Depts/los/reference_files/status2010.pdf> at 7 July 2010

UNCLOS - *United Nations Convention on the Law of the Sea*, opened for signature 10 December 1982. 1833 *United Nations Treaty Series* 3 (entered into force 16 November 1994). < http://www.un.org/Depts/los/reference_files/status2010.pdf>

FSA - *The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks* 1995, opened for signature 4 August 1995, 34 *International Legal Materials* 1542 (entered into force 11 December 2001)

IMO

Status – IMO, *Status of Conventions by Country* <http://www.imo.org/conventions/mainframe.asp?topic_id=248>

IMO - *Convention on the International Maritime Organization*, opened for signature 6 March 1948 as amended. 108 *United Nations Treaty Series* (entered into force 23 April 1947)

MARPOL - *International Convention for the Prevention of Pollution from Ships*, opened for signature 2 November 1973 as modified by the 1978 Protocol, opened for signature 26 November 1983 and as regularly amended. 1340 *United Nations Treaty Series* 61 (entered into force 2 October 1983) [Annex I, Annex II, Annex IV and Annex V].

International Convention for the Safety of Life at Sea, opened for signature 1 November 1974 as amended. 1184 *United Nations Treaty Series* 278 (entered into force 25 May 1980)

UNESCO

Status – UNESCO, *Legal Instruments/Conventions* < http://portal.unesco.org/en/ev.php-URL_ID=12025&URL_DO=DO_TOPIC&URL_SECTION=-471.html> at 9 July 2010.

Convention concerning the protection of the World Cultural and Natural Heritage, opened for signature 16 November 1972, 1037 *United Nations Treaty Series* 151 (entered into force 17 December 1975).

Convention on Wetlands of International Importance Especially as Waterfowl Habitat, opened for signature 21 December 1975. 996 *United Nations Treaty Series* 245 (entered into force 21 December 1975).

FAO

Status - FAO Legal Office, *Conventions and Agreements concluded under Article XIV of the FAO Constitution* <<http://www.fao.org/Legal/treaties/list1-e.htm>> at 9 July 2010.

Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, opened for signature 22 November 2009. FAO Tre-154601 (not in force).

Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, opened for signature 29 November 1993. FAO TRE-001183 (entered into force 24 April 2003).

International Plant Protection Convention, 17 November 1997. 2367 *United Nations Treaty Series* (entered into force 2 October 2005)

World Trade Organisation

WTO, *Members and Observers*, < http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm> at 23 July 2008.

KEY

<i>Italics</i>	Party that has formally claimed or reserved the right to claim a sector of Antarctica
X	First level Party which has Ratified, Accepted or Approved that instrument.
C	'Second-level' Contracting Party to that instrument
-	Not a party to that instrument.

Table sorted according to ratification of PEPAT and AT, then alphabetically.

Party	Instrument																		
	ATS				UNEP			FAO			IMO/UNCLOS							UNESCO	
	AT	CCAS	CCAMLR	PEPAT	CBD	CMS	ACAP	FAO Comply	FAO PSA	FAO IPPC	WTO	IMO	SOLAS	UNCLOS	FSA	MARPOL A I/II	MARPOL A IV	MARPOL A V	AFC
Antigua and Barbuda	-	-	-	-	X	X	-	-	-	X	X	X	X	X	-	X	X	X	X
Argentina	X	X	X	X	X	X	X	X	-	X	X	X	X	X	C	X	X	X	-
Australia	X	X	X	X	X	X	X	X	C	X	X	X	X	X	X	X	X	X	-
Austria	C	-	-	-	X	X	-	-	-	X	X	X	X	X	X	X	X	X	-
Bahamas	-	-	-	-	X	-	-	-	-	X	C	X	X	X	X	X	-	X	-
Barbados	-	-	-	-	X	-	-	X	-	X	X	X	X	X	X	X	X	X	-
Belgium	X	X	X	X	X	X	-	-	-	X	X	X	X	X	X	X	X	X	-
Brazil	X	X	X	X	X	-	-	X	C	X	X	X	X	X	X	X	X	X	-
Bulgaria	X	-	C	X	X	X	-	-	-	X	X	X	X	X	X	X	X	X	-
Canada	C	X	C	X	X	-	-	X	C	X	X	X	X	X	X	X	X	X	X
Chile	X	X	X	X	X	X	X	X	-	X	X	X	X	X	-	X	X	X	-
China	X	X	X	X	X	-	-	-	-	X	X	X	X	X	C	X	X	X	-
Columbia	C	-	-	-	X	-	-	-	-	X	X	X	X	C	-	X	X	X	-
Cook Islands	-	-	C	-	X	X	-	X	-	X	-	X	X	X	X	X	-	X	X
Cuba	C	-	-	-	X	X	-	-	-	X	X	X	X	X	-	X	-	X	-
Czech Republic	C	-	-	C	X	X	-	-	-	X	X	X	X	X	X	X	X	X	-
Denmark	C	-	-	-	X	X	X	-	-	X	X	X	X	X	X	X	X	X	-
Ecuador	X	-	-	X	X	X	-	-	-	X	X	X	X	-	-	X	X	X	-
Equatorial Guinea	-	-	-	-	C	-	-	-	-	X	C	X	X	X	-	X	X	X	-
Estonia	C	-	-	-	X	X	-	-	-	X	X	X	X	X	X	X	X	X	-
European Community	-	-	X	-	X	X	-	X	C	X	X	X	X	X	X	X	X	X	-
Finland	X	-	C	X	X	X	-	-	-	X	X	X	X	X	X	X	X	X	X
France	X	X	X	X	X	X	X	-	-	X	X	X	X	X	X	X	X	X	-
Germany	X	X	X	X	X	X	-	-	-	X	X	X	X	X	X	X		-	X
Greece	C	-	C	X	X	X	-	-	-	X	X	X	X	X	X	X	X	X	-
Guatemala	C	-	-	-	X	-	-	-	-	X	X	X	X	X	-	X	X	X	-
Hungary	C	-	-	-	X	X	-	-	-	X	X	X	X	X	X	X	X	X	-
India	X	-	X	X	X	X	-	-	-	X	X	X	X	X	X	X	X	X	-
Italy	X	X	X	X	X	X	-	-	-	X	X	X	X	X	X	X	X	X	-
Japan	X	X	X	X	X	-	-	X	-	X	X	X	X	X	X	X	X	X	-
Korea, DPR	C	-	-	-	X	-	-	-	-	X	-	X	X	C	-	X	X	X	-
Korea, Republic	X	-	X	X	X	-	-	X	-	X	X	X	X	X	X	X	X	X	X
Liberia	-	-	-	-	X	X	-	-	-	X	C	X	X	X	X	X	X	X	X
Malta	-	-	-	-	X	X	-	-	-	X	X	X	X	X	X	X	-	X	X
Mauritius	-	-	C	-	X	X	-	X	-	X	X	X	X	X	X	X	X	X	-
Namibia	-	-	X	-	X	-	-	-	-	X	X	X	X	X	X	X	-	X	-
Netherlands	X	-	C	X	X	X	-	-	-	X	X	X	X	X	X	X	X	X	X
New Zealand	X	C	X	X	X	X	X	X	C	X	X	X	X	X	X	X	-	X	-
Nigeria	-	-	-	-	X	X	-	-	-	X	X	X	X	X	X	X	X	X	X
Norway	X	X	X	X	X	X	X	X	C	X	X	X	X	X	X	X	X	X	X
Panama	-	-	-	-	X	X	-	-	-	X	X	X	X	X	X	X	X	X	-
Papua New Guinea	C	-	-	-	X	-	-	-	-	X	X	X	X	X	X	X	X	X	-
Peru	X	-	C	X	X	X	X	-	C	X	X	X	X	-	-	X	X	X	-
Poland	X	X	X	X	X	X	-	-	-	X	X	X	X	X	X	X	X	X	-
Romania	C	-	-	X	X	X	-	-	-	X	X	X	X	X	X	X	X	X	-
Russian Federation	X	X	X	X	X	-	-	-	C	X	C	X	X	X	X	X	X	X	-
Slovak Republic	C	-	-	-	X	X	-	-	-	X	X	X	X	X	X	X	X	X	-
South Africa	X	X	X	X	X	X	X	-	-	X	X	X	X	X	X	X	-	X	X
Spain	X	-	X	X	X	X	X	-	-	X	X	X	X	X	X	X	X	X	X
Sweden	X	-	X	X	X	X	-	-	-	X	X	X	X	X	X	X	X	X	X
Switzerland	C	-	-	C	X	-	-	-	-	X	X	X	X	X	-	X	X	X	-
Togo	-	-	-	-	X	X	-	-	-	X	X	X	X	X	-	X	X	X	-
Turkey	C	-	-	-	X	-	-	-	-	X	X	X	X	-	-	X	-	X	-
Ukraine	X	X	X	X	X	X	-	-	-	X	X	X	X	X	X	X	X	X	-
United Kingdom	X	X	X	X	X	X	X	-	-	X	X	X	X	X	X	X	X	X	-
United States	X	X	X	X	C	-	-	X	C	X	X	X	X	C	X	X	-	X	-
Uruguay	X	-	X	X	X	X	X	X	C	X	X	X	X	X	X	X	X	X	-
Vanuatu	-	-	C	-	X	-	-	-	-	X	X	X	X	X	C	X	X	X	-
Venezuela	C	-	-	-	X	-	-	-	-	X	X	X	X	-	-	X	X	X	-